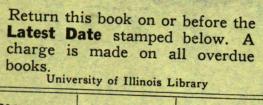


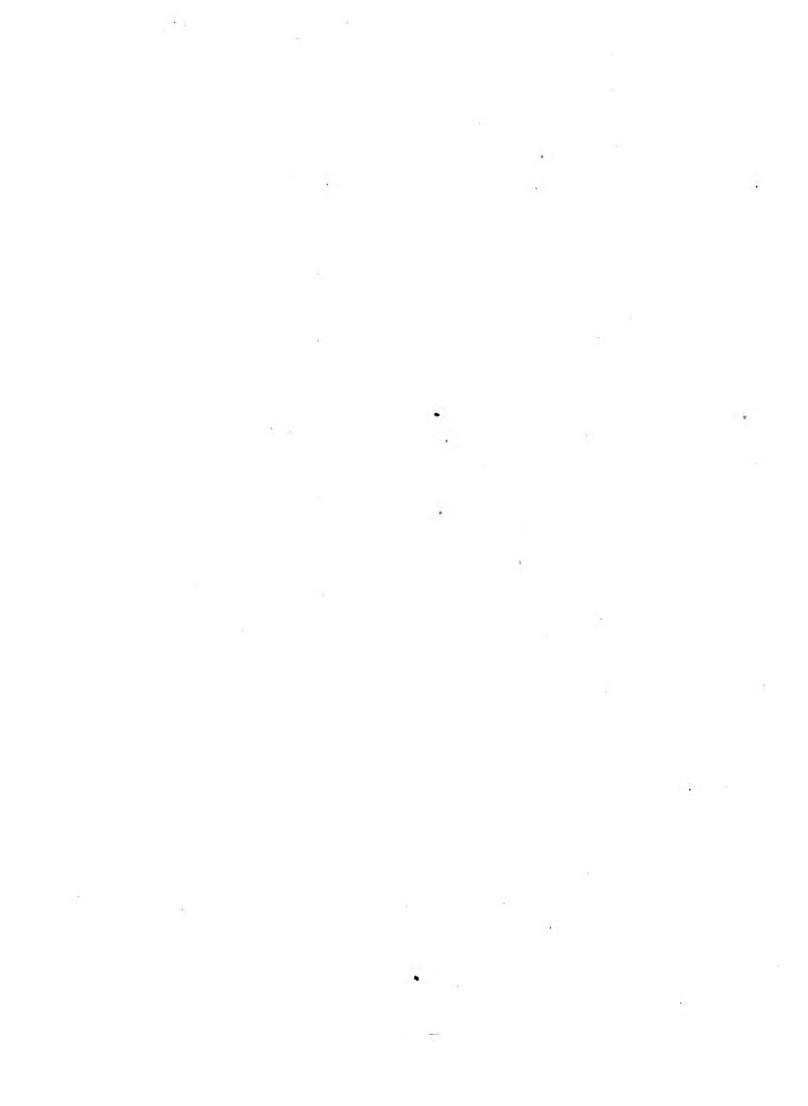
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# Yournal of Tropical Medicine

A BI-MONTHLY JOURNAL DEVOTED TO MEDICAL, SURGICAL AND
GYNÆCOLOGICAL WORK IN THE TROPICS

#### EDITED BY

JAMES CANTLIE, M.B., F.R.C.S., AND W. J. SIMPSON, M.D., F.R.C.P.

# VOLUME IV.

JANUARY 1, 1901, TO DECEMBER 16, 1901



#### LONDON

JOHN BALE, SONS & DANIELSSON, Ltd.

83-89, GREAT TITCHFIELD STREET, OXFORD STREET, W.

Colonial Agents—GORDON & GOTCH, Melbourne, Sydney, Brisbane, West Australia, and Cape Town.

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## Original Communications.

REPORT ON A GLANDULAR AILMENT WHICH PREVAILED AT BACALAR CHICO, IN FEBRUARY AND MARCH, 1900.

By C. H. EYLES.

Colonial Surgeon, Belize, British Honduras.

[We are indebted to the courtesy of the Secretary of the State for the Colonies for the permission to publish this valuable observation and report. —Ed. Jl. T. M.]

In consequence of a report received early in March, to the effect that a febrile affection with glandular swellings was prevalent at Bacalar Chico, Assistant Colonial Surgeon Harrison was directed to visit the place and make enquiries. He visited the place on March 10, and made a house to house inspection. He describes the place as a "fishing settlement at the north end of Ambergris Cape, consisting of about a score of houses and containing about sixty souls." At the time of his visit there were no cases in actual progress, so he refrained from giving any diagnosis. But on enquiry he learned that during the three preceding weeks nine persons out of the sixty had suffered from an affection in which there was fever for about three days, followed by glandular enlargements, chiefly in the neck. He looked upon the matter "with suspicion," and suggested that the place should be "inspected from time to time." Assistant Colonial Surgeon Gann, in whose district this place is situated, was accordingly directed to visit and report.

Dr. Gann visited the place on March 18. He ascertained that there had been thirteen cases in all. I append the list, giving them in the order of occur-

rence, so far as can be ascertained. Dr. Gann found three cases in which there was still some amount of glandular swelling. In two the enlargement was barely susceptible, in the third the "symptoms were well marked." None of these glands were aspirated. Commenting on these cases, Dr. Gann stated:— "There can be no doubt that, taken in conjunction with a number of similar cases, which have recently occurred in Corosal, this outbreak must be looked upon with grave suspicion," and he added that, "the more intelligent persons with whom he conversed at Bacalar Chico, expressed their opinion that the disease had been introduced from higher up the Mexican Coast, where it was reported to be prevalent at some of the settlements."

In the meantime in response to enquiries made by me, Dr. Gann reported four cases as occurring at Corosal up to March 17. On March 20, he reported two further cases from Corosal, and on March 28, he reported that two days after his return from Bacalar Chico he himself had an attack of the same affection.

Dr. Gann is the only medical officer who has actually seen any case in progress. His actual observation bears out what has been gathered as to the nature of the cases, viz.: that after some febrile disturbance lasting for about three days, glandular enlargements, chiefly of the cervical glands, appeared. Unfortunately no material from any of the glands was forwarded for examination; and no cases occurred after I drew attention to this point and requested that cover glass films of fluid obtained by aspiration might be sent me.

Whilst these events were occurring at Bacalar Chico and Corosal, a case was reported to me in Belize by Dr. Harrison, as occurring in a man from Northern River. Dr. Harrison reported that there

was a swelling in the right groin the size of a tangerine orange, spherical in shape and situated below Poupart's ligament. He added that "after careful enquiry he found it was not of venereal origin, nor sympathetic, but in his opinion, idiopathic." Others at the same place were reported to be suffering from the same complaint. In this case some pus from the bubo was supplied. Microscopic examination showed only the ordinary organisms of suppuration.

As to the nature of this complaint, I am unable to express any opinion. The sudden appearance at the present time of a glandular ailment, with febrile phenomena, in any settlement, and attacking about 20 per cent. of the people (as in Bacalar Chico) is strongly suggestive of plague. The possibility of importation of this disease is by no means remote; for at the time the disease was prevalent at Rio de Janeiro, from which place vessels in ballast arrive at Belize and the adjacent Yucatan Peninsula for cargoes of logwood. If the disease was plague then it must have been of a mild type, and being introduced in a sparsely populated country died out. I may add that no special mortality of rats, &c., was observed.

LIST OF CASES REFERRED TO BY DRS. HARRISON AND GANN IN THEIR REPORTS ON THE GLANDULAR AILMENT PREVALENT AT BACALAR CHICO.

No.	Approxi- mate Date of Onset	Name	Age (years)	Sex	Position of Affected Glands
1	13 Feb.	Petrona Munoz	16	F.	Inguinal and pop-
2	18 ,,	Matilda Zetina	31	F.	Cervical and sub- maxillary
3	25 ,,	Ignacio Aguinedo	20	M.	Cervical
4	27 ,,	John Gabourel	30	M.	Cervical
5	28 ,,	Florencio Sansares	35	M.	Submaxillary
6	28 ,,	Pedro Gonzales'	70	M.	Cervical
7	28 ,,	Paulita Camera	16	F.	Cervical
8	1 Mar.	Pablo Catsin		M.	Cervical and sub- maxillary
9	6 ,,	Catalina Mansania	2	F.	Parotid
10	16 ,,	Paulita Catsin		F.	Cervical
11		Three persons absent			
12		when the officers	11		0 22
13		visited			

<sup>&#</sup>x27; Had also chronic inflammation of axillary glands.

#### STRIKING CONFIRMATION OF MOSQUITO-BORN MALARIAL INFECTION IN A CHILD AGED THREE WEEKS.

By Dr. J. C. GRAHAM.

Deli, Sumatra.

The child in question greatly alarmed its parents by suddenly developing a rise of temperature that could not be accounted for by any of the usual causes. In response to the question whether the child had suffered much from mosquito bites, the parents replied it was usually well looked after to prevent their occurrence, but that ten days previously the native servant had carelessly forgotten to close the mosquito-curtains at night, with the result that the child was simply covered with mosquito bites the following morning.

The irritation caused by these soon passed off and the incident was forgotten.

Acting on this information I examined the blood of the infant, and found the malarial parasite.

The fever yielded readily to quinine inunction.

# TYPHUS-LIKE, ERYTHEMATOUS AND OTHER ERUPTIONS IN PLAGUE.

By Wm. Hossack, M.D. Calcutta.

In the scanty clinical accounts we possess of the early pandemics of plague, references are occasionally met with that suggest that, in the past, eruptions were of not uncommon occurrence. Thus Gibbon, who relies on Procopius, writing on the pandemic of the sixth century, says that "the bodies of the sick were often covered with black pustules or carbuncles, the symptoms of immediate death; and in the constitutions too feeble to produce an eruption, the vomiting of blood was followed by a mortification of the bowels." In the great plague of the seventeenth century Boghurst, in a description of the plague of London, mentions "spots of various colours" among the symptoms.2 In the present pandemic at least, eruptions have been so uncommon and so little marked that one finds practically no reference to them. Dr. Cantlie in his article on the spread of plague says that "petechial eruptions may be found in plague, but the eruptions met with in the Hong Kong epidemic were never characteristic, though many cases showed spots on the skin"—in fact most of the spots were apparently mosquito bites. In a later paper he describes the following post-mortem appearances: "On the skin of a person dead of plague may be found petechiæ here and there; and over the bubo itself and on the limb on which the bubo develops, dusky patches, sometimes punctate, but more often irregular in outline, are met with, causing the skin to appear mottled. A rash resembling the eruption of typhus is very occasionally met with." 8 It is not clear whether this refers to his personal experience in Hong Kong. In all the recent reports on epidemics in India the only reference I can find is a negative one. Thompson says, "An eruption of the skin of any distinctive, character although frequently looked for, was not found. In a few cases, at most, fugitive erythematous, or urticarial rashes, or mosquito bites, or lichen tropicus, were discovered. Sudamina were rarely seen; purpura spots, vibices and desquamation were conspicuous by their absence.'

In Poona in the 1897-1898 epidemic I cannot recall an eruption or rash of any sort, and in Calcutta all along they have been of the rarest occurrence. In addition to the two cases to be described in detail, I have only met once with a profuse and universal sudaminous eruption, not to speak of twice getting histories of a similar occurrence, and only once have I seen the petechial eruption which is so frequently referred to generally, but which so few observers seem actually to have seen. Dr. K. C. Rose showed me this interesting case, the notes of which are as

follows :-

"A very large swelling extends up and down the right side of the back from the midscapular to the lumbar region, oval in shape, about one inch in depth, and 12 to 15 inches long. It developed yesterday with great rapidity, and is apparently due to deep intermuscular hæmorrhage. The skin over the lower part of the swelling is reddened, puckered, rather brawny and erythematous. In the upper half the skin over it is normal unless for round black spots 1 in. to 1 in. in diameter, not raised at all, but black hæmorrhagic staining. The petechiæ are confined to the skin over the swelling, and the limbs, head and the rest of the trunk are quite free. In the lower half these spots are very scanty. The patient is dying, with the hands and feet already cold. There is no swelling of the glands. This is the fourth day of illness.

The experience of my colleagues agrees with my own, and none of them can recall a single case showing a general eruption of any kind, though they have occasionally met petechiæ, bullæ and the like on or around the bubo, or on the limb below the bubo. Dr. Pearse, whose experience has to do mainly with plague seen in Bombay, informs me that while he has never seen a general eruption of any description, he has occasionally seen a few sparse bullæ of various sizes on or around the bubo, but chiefly on the limb having the bubo. He has examined some of these bacteriologically, but they only contained staphylococci. Petechiæ are also uncommon, but he has occasionally seen them on or around a bubo or carbuncle, passing once or twice into a condition resembling post-mortem hypostatic discolouration. Dr. Pettifer and Dr. Justice have only once or twice seen petechiæ, and in addition the latter once has seen a crop of pustules on the limb under the bubo.

The first of the two cases that follow below is sufficiently interesting to justify a somewhat detailed account as, in addition to presenting this rare typhuslike rash that Dr. Cantlie mentions, it is an excellent example of how numerous glands may be affected in succession, one set increasing as another set dies down, until in this case inguinal, parotids, sub-maxillary, sublingual and axillary were affected. There is recovery from an apparently hopeless condition supervening early in the case on the fifth day of attack, characterised by convulsions and collapse, and again there is the characteristic paralysis so frequently seen in plague convalescence. The previous occurrence in the family of glandular swelling with slight fever, or in other words, in all probability a mild unrecognised attack of plague, is also to be noted. I have to acknowledge my indebtedness to Dr. R. C. Paul, the practitioner in charge of the case, for the account of the first few days of illness, for the temperature chart, and for an admirably complete record of the drug treatment of the case—a record of some importance in relation to the causation of the eruption.

Case I .- K. F., female, aged 20, caste Benia. The patient was attacked with fever on the evening of October 27, 1899; simultaneously with the fever there appeared enlargement of the glands of the neck and groin, most marked in the groin.

Previous History.—The patient is the mother of

two children, aged respectively 3 years and 10 months. Her previous health had been good up to the day of the attack. There had been no case of plague in the immediate vicinity, but her step-daughter, who resides in the same house, had suffered from fever with swelling of one of the submaxillary glands about three months previously, but she recovered in a few days without much trouble. There had been no rat mortality in the house. The patient had not been out of the house for some days before she fell ill, nor had she had any visitors. There was no case of measles in the neighbourhood, nor any case of typhus, the latter disease in fact being unknown in Calcutta.

When first seen on October 28, the patient showed typical signs of plague. The temperature was 103.6°; the pulse was full and regular (?); the tongue was slightly coated but moist; the conjunctive were slightly congested, and the patient had a stupid look and was delirious. The bowels had moved twice in the morning. The glands of the groin and neck, and the submaxillary, sublingual and parotid glands, were enlarged and tender. On the 29th the tongue was dry and coated, and the glands had increased in size. Tenderness over the liver was noted. By the 30th the swelling of the groin glands had already subsided, but the swelling of the neck was getting larger and more diffuse. On the 31st, i.e., on the fifth day of illness, collapse and convulsions supervened. The pulse became small and frequent, the extremities were cold, and the breathing was slow and prolonged. The conjunctivæ were congested, and the eyeballs turned up so that only the whites could be seen. There was frothing at the mouth and clonic spasms of the upper extremities. Thanks to mustard poultices, friction, warm applications and the like, the condition of collapse passed off, and in the evening it was noted that the neck swelling had diminished. Next day she became conscious for the first time, answered questions intelligently, and complained of pain and tenderness in the gum, and a burning sensation in the throat and stomach after taking medicine. By November 2 there was general improvement, but along with the tender gums there was now salivation. The eyelashes were noted to be fringed with mucus.

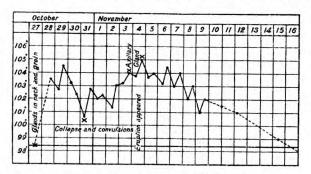
On this, the seventh day of illness, I saw her for the first time, and describe her condition as follows: Temperature 101.5°, pulse 140, but not markedly weak. Respiration is easy; the chest has not been examined. The tongue is clean at the tip with white streaks along the dorsum, but at the back it is brown and foul. The eyes are not congested. The speech is a little thick and slurred. The patient is quite con-

scious; the face is drawn and anxious.

Buboes.—There are large parotid buboes on both sides of the neck, most marked on the right, where the swelling extends right down the neck and involves the submaxillary gland. The swelling is soft, but no fluctuation can be made out in it, and its general appearance is in accordance with Dr. Paul's statement that it is decreasing. The glands of the left axilla are enlarged and tender. The patient is taking nourishment badly and nausea is present. On November 4, 1899, the pulse is not good, 140, weaker and slightly running; temperature is 103°; the breathing is rather laboured, but there is no cough. The general wasting of the patient is marked. This evening Dr. Paul noticed the eruption for the first time.

The Eruption.—It was on the evening of the ninth day of illness, then, that the eruption appeared as papules on the back and shoulders. Its appearance was preceded by nausea, developing into troublesome sickness during the night. Next morning the face was also affected, and it had begun to spread over the body till by evening the whole trunk was covered by it. Dr. Paul describes it thus: "Each individual papule was the size of a large pin's head, red, and raised above the surface of the cuticle with an abrupt margin; there was violent itching. Next day, on November 6, 1899, the papules were much more widespread and numerous, and tended to coalesce; itching was constant. Burning in the throat was complained of after taking medicine." On the 7th the notes run: "Each individual eruption is getting darker in colour and is extending in area; itching is present. Headache and nausea are complained of." That day I saw the eruption for the first time and found the following condition: The eruption covers head, face, neck, the whole of the trunk and limbs, in fact the whole body, unless for the palms of the hands and soles of the feet. It consists of purplish, dusky maculæ, raised for the most part into papules varying from  $\frac{1}{3}$  in. to  $\frac{1}{6}$  in. in diameter. These tend to be confluent, and in parts are sufficiently raised, particularly about the shoulders and back of the neck where the eruption first appeared, to give the skin a nodular, brawny appearance, added to in this region by the skin between the papules also being infiltrated. This last is most marked in the face, giving it a swollen look which, taken along with the puffy eyelids, slightly congested conjunctive and very slight conjunctival discharge, presents a picture extremely like that of measles. There is no discharge from the nose. The general condition shows little change, unless that the pulse is stronger and that the right parotid and submaxillary swelling is, if anything, increased in size.

On November 8, 1899, the general condition was rather improved, and as for the eruption, what had on the previous day been noted as maculæ on the right upper arm had now developed into papules. It had begun to subside on the face. The tongue,



as far as can be seen, for the swelling of the neck impedes the opening of the mouth, is clean.

On November 12, 1899, Major Drane, special health officer, saw her along with myself. Pulse was 104, strong, regular; temperature 101°. Swelling on both sides of the neck has almost disappeared. The

eruption has for the most part faded, but dark purple maculæ still mark the arms, the last place on which it developed. The tongue is clean. The patient is asking for food, and the general condition is much improved. On November 15, 1899, she was found with temperature 99°, a pulse of 80, but very feeble. She seemed too weak to be shifted to another room for purposes of disinfection. She was wandering a little, and altogether her condition was not satisfactory. The rash, unless on arms and legs, has completely faded, and the glands are now altogether absorbed. This temporary relapse, due probably to slight heart failure—that failure that so frequently carries off a plague patient who seems completely convalescent—passed off, however, and on November 20, 1899, three weeks from date of attack, she was found out on the verandah practically recovered. There remains, however, a paretic condition of the lower limbs, so that the only method of progession is a shuffle in a sitting posture with the thighs flexed on the abdomen. Apparently the extensors of the thigh are affected, but examination was refused, so exact condition cannot be stated. The hands and feet show black hæmorrhagic spots on the site of the papules, much darker than they have been at any previous time. In ten days the paresis had passed off and she recovered completely. Dr. Paul notes that there was slight desquamation as the black maculæ passed off; personally I noted none.

Remarks.—Before definitely ascribing the causation of this extraordinary eruption to plague pure and simple, it is necessary to take into consideration the three possibilities of mistaken diagnosis, supervention on plague of typhus or measles, and whether the rash may not have been due to drug treatment. As regards diagnosis, it may be pointed out that unless for this rash appearing on the ninth day the case was as clearly and characteristically one of plague as one could wish to meet with. Both typhus and measles can be definitely eliminated for several reasons, not the least important of which is that typhus is unknown in Calcutta, and that measles, though a few sporadic cases were occurring in the city, was non-existent in the particular vicinity in which the woman lived. Moreover, even though it had been, the possibility of exposure to it must be set aside from the fact that the woman had neither been outside the house nor had received any visitors for some days previous to the onset of illness. Apart from the other features of the case, the date of appearance of the rash is also against the assumption that either of those two diseases can have been the cause of it. The extraordinarily close resemblance of the rash to that of typhus is very striking, however, for Moore's description of the latter in Allbutt's "System of Medicine" is almost absolutely applicable to the case. The order of appearance in the different parts of the body is slightly different, however, for in typhus the rash appears first about the armpits and the wrists, whereas the shoulders were first affected here and the wrists much later. In typhus "inflammatory swellings or buboes are not infrequent at or after crisis, especially in the parotid or submaxillary regions. To Murchison this fact suggested the kinship of typhus and Oriental plague or bubonic fever. He went so far as to say

that typhus is probably the plague of modern times." The words "at or after crisis" are the crucial ones, for the buboes of plague are a very early symptom, if not actually initial, as in the present case. Murchison's contention may probably be correct as regards earlier pandemics of plague, particularly as eruptions, as already referred to, seemed to have played an important part, but as regards the present pandemic it is quite inapplicable, for, as I have shown, eruptions of any kind have been of the rarest occurrence.

The question of drugs is less easily disposed of than that of supervening disease or wrong diagnosis, for both belladonna and mercury were exhibited till physiological symptoms began to appear. In addition to the external application to the buboes of empl. belladonnæ liq., the tincture was administered for the first ten days in doses of m v. every three or four hours; burning of the throat was noted as early as the fourth day, while itching appeared along with the eruption on the ninth day. Nothing abnormal was noted in the pupils. The rash of belladonna is however a scarlatina-like rash, is of a fugitive character as opposed to the persistence shown in this case, and so far as I can find, is very unlikely to display itself as a morbilliform eruption eventually becoming purpuric. As regards mercury, I can only quote Professor McCall Anderson, who says that though cutaneous manifestations from the use of mercury have been described by some observers, he has never met with a case of the kind, and is of opinion that the so-called "eczema mercuriale" only occurs as the result of irritation due to local application of the drug.6 Dr. Stephen Mackenzie, quoted in the work referred to, includes it however as one of the causes of drug purpura. So, as no less than 36 grs. of hydrarg. subchlor. was prescribed in the course of the first eight days, mostly in doses of gr. ii., and slight salivation and tenderness of the gums were noted, it must be admitted that, possibly, mercury may have been the cause. But the possibility is not a probable one, so that on the whole, after a consideration of all the facts of the case, particularly that such an eruption has been noted in plague before, one must come to the conclusion that the eruption was a plague eruption.

Case II.—Jado, aged 50, female, caste Sonar Benia, 80н, Lower Chitpore Road. This patient was found on March 30, 1900, suffering from plague, fever and bubo having come on three days previously. Her condition is described by Dr. Sunyal as follows: Temperature, 103° F.; pulse 120, small, feeble, compressible; respiration easy, and there is no cough. There is a typical left axillary bubo. The patient is semi-conscious. I saw her three times during the next five days, during which she gradually improved. On April 5, 1900, it was noted that the bubo had almost absorbed, but a large raw surface was left over it, the result of excessive application of iodine. Her temperature was then 101° F., and her general condition, though much improved, still weak. On April 9, 1900, the fourteenth day of illness, a measloid erythematous rash appeared, first of all about the shoulders. On April 10, 1900, I describe her condition as follows: There are large erythematous patches and splotches all over the trunk and limbs, face and head, back and front. On the back they are very large, 1 to 2

inches in diameter and irregularly circular in shape; in parts they are confluent. The smallest spots, inch in diameter, are found on the limbs where the eruption is least marked. Over the shoulders, on the other hand, the eruption is almost quite confluent. The eruption is very slightly raised and in colour is a light pinky red showing markedly against the skin, which in this woman is very light. There is no duskiness at all. There is slight itching about the spots. Previous to this the patient's temperature had been normal for two or three days and she had been apparently recovering, but the temperature is now 102° F., the pulse 110, feeble, and the general condition is very weak. On April 13, 1900, the eruption was noted to have almost faded, but reddish maculæ inch to 3 inch in diameter were still to be seen on the legs, where it was last to appear. The back was then almost quite clear. The temperature was normal and the patient practically recovered.

Remarks.—Iodine may be eliminated in this case not only on account of the character of the eruption, but from the fact that the general symptoms of iodine were wholly absent, and that the limited external application had been stopped for some days before the appearance of the rash. The only other drug to be taken into consideration is digitalis, of which m vii. doses of the tincture were given every four hours for some days. But the digitalis rash is scarlatiniform, and moreover the use of the drug had been stopped before it appeared. The eruptions described present some points common to both cases, for in both it began on the shoulders and thence spread all over the body, the limbs being last affected. In both it was more or less morbilliform; and in both, though it seemed to be accompanied by a slight aggravation of symptoms limited in the first case mainly to rise of temperature but in the second case almost amounting to relapse, it failed to affect the ultimate progress of the cases to recovery.

Conclusions.—In the past, pandemics of plague eruptions seem to have been not uncommon, and at times seemed to form one of the diagnostic symptoms. It is possible that the explanation of this may be found in typhus fever, particularly as in the present pandemic general eruptions have been of the rarest possible occurrence. Amongst those that have been noted are typhus-like, morbilliform, erythematous, urticarial and sudaminous rashes. Partial local eruptions, though not so rare, have been uncommon—they include bullæ, pustules, petechiæ, and purpuric patches.

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Moore, J. W., "Allbutt's System of Medicine," vol. ii., p. 357.

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THE

# Journal of Tropical Wedicine

JANUARY, 1901.

#### ANNOUNCEMENT.

THE JOURNAL OF TROPICAL MEDICINE will in future be issued twice monthly. The Editors find that they are justified in taking this important step in view of the increasing circulation of the Journal, and also that they are compelled for reasons of space to increase the issue. Readers of the Journal will have observed that current literature has not received sufficient attention lately; this has arisen not from want of material but from want of space. The original communications have grown so encouragingly that but little space is left for current literature. With the space now available this important omission will, it is hoped, be corrected, and the JOURNAL become a register of literature as well as a medium of publishing papers.

The Editors have received valuable suggestions

from time to time from contributors and subscribers, and as a Journal of the kind was essentially an experiment, they have availed themselves of the opinions of others. They are deeply indebted to Major O'Gorman, I.M.S., for many excellent hints and suggestions, and beg to convey their thanks to him and to others who have favoured them with their opinions and advice.

#### A NEW YOLUME COMMENCED.

An additional change is also found expedient. The Journal was first issued in August, 1898, and consequently the yearly volume ran from August to July, a most awkward division. At the risk, therefore, of causing some confusion in binding, &c., the Editors think it advisable to commence the new volume with the year, and more especially as a new Century is being initiated. The annual subscription will for the future be 18/-, the price of each part 1/-.

## A BROKEN-HEARTED SERVICE.

THE state of mind in which most of the medical officers of the Royal Army Medical Corps, who have served in South Africa, describe the feeling in the corps generally, is one of broken - heartedness. We can only view such a state of things as a national calamity and one which will have baneful effects in the immediate future. A service with its spirit gone, its aspirations thwarted, and its members dissatisfied, is not calculated to attract recruits to its ranks, nor to retain those who have joined it beyond the period of optional retirement. That there is something wrong somewhere, every one seems to be agreed upon; but where the cause of the dissatisfaction exists it is not so easy to determine. The one point, however, apparent to every one is, that the medical departments had an impossible task to perform; the magnitude of the work before them was out of all proportion to the strength of the corps; they were asked to accommodate and treat hundreds of sick and wounded where provisions were only made for tens; they were expected to bring their field hospitals to the front when transport was denied

them; to provide invalid food in a country barren of the ordinary necessaries of life, even in times On the top of this, whilst yet the of peace. campaign was proceeding, whilst the medical department was trying to make bricks without straw, and sacrificing health and life heroically in the performance of duty, appears adverse criticism from irresponsible persons, criticism of such a kind that contradiction availed not, and took no heed of well-nigh unsurmountable difficulties. At home, again, the medical officers of the Army are being told constantly, by those who ought to know better, that they are of inferior professional mould, that they are recruited from any but the best class of young medical men, and that consequently they are not worthy representatives of the profession to which they belong.

Can it be wondered at, therefore, that the members of the Royal Army Medical Corps are depressed, that they see no prospect of betterment, and that they cannot take pride in the service to which they have devoted their lives? A soldier with his spirit gone, a corps that has lost its verve, is not a cheerful sight, nor a state of mind calculated to produce the best results.

We would, however, join issue upon several of the points that are being constantly mooted when the medical service of the Army is being discussed. We deny the statement that the medical men who enter the service of the Army consist of the least capable of our young men. There is a notion abroad that an Army doctor has a training and qualification apart from the medical man in civil life. It seems absurd to refer to so gross an error, were we not aware that the belief exists, and largely exists amongst the laity. A formal denial of so ignorant a conception is an easy matter, but we would go much further than that and state that the young medical man before he gains his commission in the Army is, as a rule, above the average in professional ability.

After his qualification is obtained he has to set to work to prepare himself for a further examination, and not only an examination, but until quite recently, a rather keenly competed-for appointment, in which the best men only were

chosen, and the "failures" sent back to civil life. After "passing in," a further most valuable and useful training is obtained at Netley, and by the time he "passes out" the young Army doctor is head and shoulders above the confrères he left behind him in civil life in almost every branch of his profession. We deny, therefore, the statement that he enters upon his duties in the Army as a professional inferior, when compared with medical men of his own age in civil life. Far other is the case; for by the training and by the examination superadded after his qualifications have been obtained, he is more highly educated in his profession than perhaps the best of his classfellows who have rested on their laurels, and gone straight into practice after obtaining a qualification. Up to recent years, at any rate, almost every medical school in the kingdom prided itself upon the position its pupils took in the examinations for the Army, and published the results in the form of an advertisement as to the excellence of the training they afforded. Many of the medical men, therefore, over ten years' service in the Army, went in at a time when competition was keen, when the lazy and ignorant had no chance of getting in, and therefore did not come up for examination, and we hold it to be a mis-statement to say that the men joining the Army were professionally inferior to their civil brethren. After taking up duty in the Army the professional experience may be indifferent, there may be less stimulus to work, seeing that pay comes as a matter of routine; but our contention is that the medical profession gives, not its worst men to the Army, but men above the average, and, not infrequently, the best men of our schools went into the Army, attracted partly by the fact that the entrance was a competitive one. It is the fault of the military authorities, therefore, if they misuse the material supplied to them; we do not send our worst, at one time we even sent our best men, and the cause of the "broken-hearted" state the medical service in the Army finds itself, lies not with the inferiority of the supply from the medical schools, but with the system in vogue in the Army which permits so discreditable a state of affairs to have come about.

The aspiration of the junior officer is naturally to gain the higher ranks of his profession, but by attaining that rank what does he find? That he has to gradually drop his profession and become an administrative officer. He has to see to the administration of the hospital, not the treatment of the sick. His work is no longer at the hospital, but in an office, and his stethoscope and bistoury give place to a pen. After attaining administrative rank he grows more ignorant of clinical work daily, until, after say, ten or fifteen years in that capacity, the practice of his profession is a thing of the past. Theoretically, every medical man in the army is being trained to fit him for duty as the director-general of his department. Administration is the one great recommendation to advancement, and the correctness of reports are more highly prized than the lives he has saved. Even the more junior officers are harassed by clerical work. It is reports, reports, reports, that are wanted, rather than cures or good doctoring. All civil medical men who were with the army in South Africa testify to the wonderful administrative ability of even the more junior officers of the R.A.M.C. They speak in terms of unstinted praise of their capabilities in this direction, but all equally lament the fact that the time of medical men should be wasted in this manner. Much of the work they think could be done by quarter-masters. The medical officer is too valuable and too expensive a man to the nation to be so hampered and misused. If, on the other hand, the work can be done by no other than medical men, two branches of the service should be recognised, namely, a clinical and an administrative, and a captain about to be promoted to major should determine which he is to join. Should he join the clinical, and continue in it, the medical officer in the army will become the equal, in a professional sense, of the senior men in our great hospitals in civil life; or if administration is his bent, let him lay aside his profession and take up as at present the most necessary part of hospital administration. It must be remembered, however, that our hospitals in civil life are not administered by medical men, but by the laity; and it is difficult for the

civilians to grasp the fact that it is necessary for one in the position of a qualified medical man to do in the army what is excellently done by a committee and secretary in civil hospitals.

It is argued that the army officer is dealing with public funds, but so are the authorities in civil hospitals. The public subscribe voluntarily to support our civil hospitals, and not only so, but were the moneys they give not properly administered the supply would speedily cease. There is no difference, therefore, in responsibility, and the civil hospital accounts, stores, food, &c., have to be as carefully checked and dealt with as in a military hospital. One is done by persons without medical training, and why not the other? Allow the medical officers, therefore, more responsible clerical help, so that they may be enabled to continue to treat the sick and grow in medical knowledge with advancing years. In this way alone can the army service become a (medical) "professional" service, and one which will be self contained; one which will require no consulting surgeons attached to it from civil life to satisfy the public, but will be complete in clinical acquirements, as at present it is equipped with men of high administrative ability.

We confront the military authorities, therefore, with the facts, that it is not the quality of the men sent by the medical schools of the country that is at fault, but the system these men are submitted to, after joining the Army, whereby professional work is ignored and administrative ability is appreciated to the exclusion of clinical acumen and the treatment of the sick and wounded.

RHEUMATISM AND MALARIA.—R. P. Banerjee in his article "Rheumatism and Malaria," remarks that he has studied the two affections, and his observations have led him to the conclusion that there is a pathological connection between malaria and rheumatism. He is strengthened in this belief by the fact that the same medicaments are equally efficacious in the two diseases, be they used as remedies or preventives. The actiological conditions are common to both rheumatism and malaria. Dr. Banerjee also mentions that malaria creates a special pathological condition of the blood, which acts as a predisposing cause for rheumatism.—Ind. Med. Lancet, October 16, 1900.

## Translations.

# MALARIA AND MOSQUITOES ON THE WEST COAST OF AFRICA.<sup>1</sup>

By Dr. Hans Zirmann, Staff Surgeon, late Government Physician in Camaroon.

(Translated from the German by P. Falcke.)

#### REPORT II.

I obtained the material, which must here be regarded as preliminary, in the first place in Camaroon, where I was Government Physician from the commencement of March, 1899, until April, 1900; then in Victoria, which is situated at the foot of the Camaroon Mountains, 4,000 metres high, during the two following months; and finally from June to July in the Colony of Togo. In Togo I was indebted to Dr. Bludan, the Government Physician, for affording me the opportunity of carrying on my investigations, he very kindly having placed his laboratory

at my disposal.

In 1894-1896 I had already had the opportunity of conducting tropical-hygienic investigations on the west coast of Africa. Each of the three above mentioned fever regions represents, to a certain extent, a type of its own: Camaroon, low-lying and marshy soil, which is intersected by innumerable creeks filled with brackish water; Victoria, a mountainous coastal region with a basalt soil, traversed by a few swift mountain rivulets, and with a few marshes in the valleys through which the ground-water comes to the surface; finally Togo, in the locality of Little Popo, a narrow sandy coastal region, on one side washed by the sea, and on the other by a very long lagoon, into which many rivers flow, and in which consequently the masses of water have a certain movement. The situation of the ground water in all three localities averages from  $1\frac{1}{4}$  m. to  $1\frac{3}{4}$  m. below the surface. dampness is relatively great. The differences between the maximum and minimum temperatures are but

The rainy season in all three regions is from about April or May to the middle of October. The district of Victoria has the largest downfall, about 3,800 mm. In Debundja, which for abundance of rain stands only second on the globe, the downpours are even 10,000 mm.; in Camaroon the downfall is about 3,500 mm. The estimates for Togo have not been noted regularly, but are of less importance. The sea breeze in Togo is mostly very strong, blowing nearly the whole day. In Camaroon and Victoria it only comes on towards midday and is replaced at night by a very faint land breeze. The circumstance that three fever regions, so geologically dissimilar, could be studied together, may perhaps lend somewhat more general interest to

the following observations.

The results gained at the one place by no means hold good for other fever regions also. The Brothers Plehn and Dr. Wicke have already reported the high morbidity and mortality, caused primarily by malaria,

in the regions mentioned. From June, 1898, to June, 1899, the mortality in the district of Camaroon was 9.8 per cent. per annum out of a total of 186 white inhabitants. This is a very high figure when the fact is taken into consideration, that in the majority, it related to strong men, and who, at least as far as the Germans were concerned, were in the military service. In the army in Germany, it is well known that the mortality per annum is exceedingly small.

The morbidity and mortality being, as is the case in most malarial regions, subject to great variations, it is highly necessary, in order to avoid erroneous conclusions, to embrace long periods and to make a large number of observations for the purposes of obtaining

reliable results.

First of all I was able, in Camaroon, Victoria, and Togo, to confirm the fact that the type of primary tropical fever was generally the "tertiana maligna" in patients who had not been influenced by quinine, and who had previously never taken quinine. Short afebrile intervals alternated with rises of temperature for twenty-four hours, and upwards, during which the temperature oscillated from  $1-1\frac{1}{2}$ ° C. R. Koch first of all called attention to the difference of the temperature charts of primary cases of fever as yet uninfluenced by quinine and of relapses.

Occasionally, however, there are found cases on the West Coast in which the first rise of temperature persists as long as forty-eight hours, and in very rare cases even lasts for seventy-two hours. In these cases, in the clinical sense, the type of fever may be the continued, irregular, or remittent. In such cases there are observed from the blood of the finger, often simultaneously, all forms of the tropical parasite, from the tiniest rings to the large crescents with initial pigmentation, which shortly afterwards complete their

segmentation in the interior organs.

I think I am justified in regarding such cases as continuous, irregular or remittent, and in contra-distinction to R. Koch, positively maintain their occurrence in the tropics. The relapses mostly run their course as the double tertian or simple tertian types; the fever curves meanwhile, being much more pronounced than is the case with the maiden or initial attack of

tropical fever.

I have never on the West Coast been able to confirm a subsequent fever, as described by Koch in East Africa, and which is supposed to be caused not by parasites, but by the absorption of the dead parasites. It certainly did happen that after the potency of the fever had been broken, in a number of cases a slight rise of temperature occurred; but in at least 50 per cent. of such cases the rise in temperature was explicable by parasites, though in exceedingly small numbers. It may be mentioned that (as A. Plehn with myself have already called attention to) in Camaroon, the number of malarial parasites extant in the peripheral blood often, nay in the majority, are in a remarkable disproportion to the severity of the clinical symptoms. I never, even in the severest cases, saw in Camaroon such numerous forms of the small parasites, as for instance are met with in the Maremmas of Tuscany.

In case of relapses occurring in Europe the Camaroon parasites might be much more numerous than in

<sup>&</sup>lt;sup>1</sup> From a lecture delivered in the Pasteur Institute on August 6, 1900, at the International Medical Congress in Paris. For Report I. see December issue (1900) of this Journal.

Camaroon itself. This fact opens up the possibility that the small parasites of South Europe and the tropics often exhibit varying virulence according to the local conditions to which they owe their existence. Or can it be that the Camaroon parasites in Camaroon show a particular disposition to hide in the interior organs. The investigations conducted in this direction have yielded as yet no positive indications.

In contradiction to those persons who designate every case with a negative condition of the blood as non-malarial, it may be remarked that there are cases in Camaroon, though of rare occurrence, in which the clinical symptoms, such as regular intermittent fever, &c., undoubtedly speak for malaria, and in which the most careful and frequently repeated blood examinations only resulted in the finding of isolated parasites in the peripheral blood, and then only after the lapse of several days. Already in 1896 I directed attention to the extraordinary similarity between the tropical parasites and the estivo-autumnal parasites of the Italians. In my book also, I expressly class the æstivo-autumnal forms of the Italians, and the parasites of the tropics in one group. R. Koch classed the æstivo-autumnal and the tropical forms of East Africa together as directly identical. Without by any means setting up the æstivo-autumnal and the tropical organisms as different kinds of parasites, it is worthy of note that the adult parasites of the "tertiana maligna" of the Italians occupy from one half to two-thirds of the red blood corpuscles and as such, are but occasionally seen in the peripheral blood till advancing to segmentation. The largest parasites of the Camaroon tropical fevers, in so far as they are to be seen in the peripheral blood, at most occupy from one-fifth to one-fourth of the infected red blood corpuscles. The segmentary forms likewise appeared to be on an average one-third smaller than those of the æstivo-autumnal. I have never in Camaroon seen such an agglomeration of pigment in the parasites of the tropical fevers as in those of the Maremmas of Tuscany; and this holds good in examinations of stained as well as of unstained preparations.

In opposition to A. Plehn and Laveran I would, however, steadfastly adhere to my opinion as to the difference in kind between the tropical parasite and the ordinary tertian parasite. It may be of practical significance to mention that lately several cases have been again observed of white persons, whose temperature hardly went up to 37.5° C., but in whom, nevertheless, the development of the parasites went on uniformly, without the slightest feeling of fever being perceptible. Of course, these isolated cases had as their subjects anæmic persons who had already suffered considerably from malaria. In still rarer cases, microscopically diagnosed as first attacks of fever, the temperature was not even 38.0° C. (See article in the Centralblatt für Bakteriologie, 1896, vol. xx., p. 670).

In negroes this condition seems to be of more frequent occurrence. The subjective disorders in these people are less pronounced than in the white race, and often there is no disorder at all. I have seen and described a corresponding condition in Italy, occasionally in quartan fever. Personally, with a parasitical infection of the æstivo-autumnal type in

Grosseto, I only had a temperature of 37.80° C., although at the commencement of the infection parasites were present in fairly large numbers.

There also occur cases in which malaria had been microscopically confirmed, and in which periodically there return again and again a considerable general feeling of indisposition, mostly accompanied by a sensation of depression. No satisfactory explanation for this has hitherto been given. Increase of temperature is scarcely or not at all observable, and no sign of parasites, notwithstanding careful examinations. Nevertheless, when quinine is taken these exceedingly distressing symptoms abate in degree. Bacteriology will never designate these cases as malaria, but the practitioner will give quinine, and with good results.

Perhaps the ætiology of these symptoms will become clearer to us when we are in possession of a satisfactory elucidation as to the nature of the relapses. I hitherto have taken it that a few malaria germs have remained latent in the interior of the organs after recovery from malaria, and when a predisposing cause arose they again germinated, thus causing the relapses. Part of the relapses will, no doubt, eventually be explained as above, when the first attack of fever has not been rationally and energetically combated with quinine, but as yet it seems questionable if this applies to all relapses.

In the case of two negro children who were suffering with splenetic tumour, who had had frequent relapses but had never taken quinine, I performed puncture of the spleen a week after the last attack had passed over. With the exception of a few isolated crescents I found no trace of active malarial parasites, in spite of the most careful examination of nearly 100 preparations.

A. Plehn conjectures that certain granules in red blood corpuscles, which absorb basophil, occasion the relapses by transformation into active malarial parasites. These granules correspond with granules similarly stainable which I discovered three years ago in the red blood cells of cattle ill with Texas fever. These granules I had regarded hitherto as appearances of degeneration.

It may be propounded, whether the crescents, &c., in short, the sexual forms, which, as is well known, remain in the spleen and bone-marrow long after an attack of malaria, are not to be brought into relation with relapses; in this connection my investigations are not yet concluded. We also know nothing whatever of the changes which take place to transform the malarial sporozoites, injected by mosquito bites, into ordinary malarial parasites. The conclusions of MacCallum, Koch, Grassi, Bignami, and Bastianelli as to the relation of the sexual parasitical forms in blood preparations have been confirmed anew and the presence of chromatin in the microgamete of the flagellating body was called attention to in 1897.

Clinical Features. — Notwithstanding the exceedingly severe nature of the illnesses, the tropical fever of Camaroon gives, on the whole, a favourable prognosis, provided of course that the therapeutics are rational. I only lost two patients with simple malaria, one who had been under other treatment, and whom I only saw just before death; the second

was found on his bed one morning unconscious, and shaken with tonic and clonic convulsions; he was foaming at the mouth, and he had an ever-increasing fever rising to 42° C. Blood from the finger gave negative results. He died after ten hours. Autopsy revealed severe cramming of the cerebral capillaries with malarial parasites.

During my last period of service on the West Coast, with the exception of the parasites of tropical fever, I never saw quartan parasites in white people, only tertian parasites, and these only in Camaroon, and even there only on three occasions, and of these one case came from the rocky island of Fernando-Po.

Koch, in East Africa, found the tertian parasite in 10 per cent. of all cases of fever; in Camaroon I found the same only in 1·1 per cent. of the cases. This difference is exceedingly remarkable, and signifies in other words: In Camaroon the clinical feature of malaria is dominated almost exclusively by the tropical parasite. In negroes in Camaroon and Victoria I

also found only the parasite of tropical fever.

The investigations as to the frequency of malarial infection in negroes yielded interesting data which I will touch on later. The resistance of negroes in this respect is well known. Six years ago (see my book, p. 46) I had observed the frequency of splenetic tumours in little negro children in Camaroon. I examined a great number of natives in Victoria and Togo, as well as in Camaroon, and in the latter place I specially examined various coastal races, and, for purposes of comparison, races from the interior which lies higher. Contrary to the East African mountain folk mentioned by Dr. Koch, none of the West African people I examined ascribed malaria to mosquitoes.

I think I may be assured of your agreement with me when I mention the probability that the presence of splenetic tumour in 99 per cent. of the cases may be taken as a sign of malaria, past or present. In Togo in particular, a large number of blood examinations were made, and in Togo alone 250 negroes were

submitted to this test.

When I found only crescents or a number of melaniferous leucocytes, of course I took it for

granted that malaria had been present.

Those who have learned to know the intelligent natives of other tropical regions can hardly picture the difficulties to be overcome in dealing with the uncommonly superstitious negroes of Camaroon, and especially of Togo. The results attained were that:—

(1) The mulattoes in Camaroon all showed the

traces of malaria infection.

(2) The negro children in Camaroon, Victoria and Togo from birth to the 15th year are particularly susceptible.

(3) The susceptibility diminishes as the age advances, without, however, disappearing entirely.

The children of the Dualla, the inhabitants of the estuary of Camaroon, show the infection or the traces of infection:—

Up to 5 years in 37·1 per cent. of cases. From 5 to 10 years in 18·8 per cent. of cases. From 10 to 16 years in 21·8 per cent. of cases.

The two last figures almost coincide. Out of a total of 170 Dualla examined (adults and children), 23 per cent. bore the traces of malarial infection.

After the surrender, and before they emigrated to their present district, the Dualla had already dwelt in the marshy valleys on the Lungasi, so were already acclimatised. The percentage of the people of the Ngumba and Jaunde, who originally lived far in the interior on the western declivity of the inner African plateau, at a height of from 600 to 1,000 m., was 12 to 23 per cent., provided that they were examined as soon as possible after their arrival from their home. According to verbal communications, Jaundes, who never come to the coast, also suffer from malaria in their own home. Minute investigations and experiments by the military doctors on the spot are urgently needed.

A remarkably high percentage, up to 75 per cent., was found in captive women of the anthropophage race of the Bulis, from the districts of the great primeval forest which extends from the coast to the border of the plateau of Central Africa; the percentage in children was up to 100 per cent. As all these persons had only been on the coast from two to four weeks, and a splenetic tumour, as is known, only comes to pass after several attacks of malaria, it is possible that a portion of these negroes had already acquired the infection in their native land. In any case, in comparison with the coastal inhabitants, these people showed an extraordinary susceptibility for malaria; whereas the Dualla, living in Camaroon, with its evil repute as regards malaria, had certainly become infected to the number of 23 per cent.; 159 Eweites in Togo, whose blood was minutely examined, exhibited to the number of 47.2 per cent. active parasites, or even crescents, or melaniferous leucocytes. In 32 of the 159 persons of the Ewes tribe I found the tropical parasite, in one the tertian, and in seven the quartan parasite. Mixed infections of quartan and tropical fever also occurred. Persons of the Ewes tribe, aged 30 years and upwards, with malaria microscopically confirmed, who frequently felt ill, and suffered with relapses, were often seen. Nothing could be ascertained as to the former dwelling place of the Eweites and the period of their immigration to their present district.

Splenetic tumours were found in 33 per cent. of 193 Ewes negroes examined in Togo. Thus the results gained, on one side by palpation of the spleen, and on the other by blood examination, do

not quite coincide.

The commercial people of the Haussa, who came originally from the steppe-like interior of West Soudan, also exhibited infection, but more frequently in children than adults.

At any rate, I cannot for West Africa accept the view that natives in their youth attain full immunity. It seems more rational in such cases, upon the whole, not to speak of immunity, but of increased power of resistance against malarial infection. Even the Bakweris living between unhealthy swamps in Victoria only gained a relative resistance after their tenth year. The natives of the Maremmas, the Campagna, &c., would on this supposition also be immunised. It has long been a well-known fact on the west coast of Africa that white people also, who at the commencement of their stay frequently had fever, at last attained a sort of relative resistance.

I know a gentleman who, formerly, recovered from innumerable attacks of fever, and had hæmoglobin-uric fever thirteen times, who at the present only gets slight attacks every three or four months. In Togo the merchants even prefer to keep clerks who had weathered their first year of stay there. On the other hand it is possible that people who have been on the West Coast in fever regions for twenty-three years in good health (that is to say, who have had but few fevers) may yet succumb to simple tropical fever.

Most of the fever cases in negroes recover spontaneously. A number of the children, however, die of severe cachexia. With whites also, as has been long known, there is not rarely spontaneous recovery from relapses. Nevertheless, the danger of relapses is great where there has been treatment without quinine. Spontaneous recoveries from the first attack of fever in whites do occur, but very rarely, at least within the first eight days from the outbreak of the In regard to seven inoculatory experiments which were undertaken on willing adult negroes with malarial blood containing the tropical parasites, the result was that in 3 cases the fever broke out after twelve days, in 1 case after ten days, in 1 case after eleven days; in 3 cases the experiment was negative. The circumstance that the inoculation was successful in 71.42 per cent. of the cases certainly by no means bears out the idea of complete immunity, attained earlier in life, of the negroes so inoculated. Of course these experiments, carried out in a malarial district such as Camaroon, are not of absolute value, although every effort was made to exclude the possibility of a natural infection. At all events the duration of the period of incubation of ten to eleven or twelve days tallies with the time of incubation which, with the Plehn Brothers, I fixed for Camaroon as between eight and fourteen days. It may be a fresh fact that the most pronounced leucocytosis happens to be found in negroes ill with malaria, and in the leucocytes so large a number of grains of pigment as has never been seen in patients of the white race. This doubtless has some connection with the mechanism of spontaneous recovery.

Places free from malaria have hitherto not been found, nor any in which, as Laveran thinks, malaria was extant before the immigration of man. The proof of the existence of such places can hardly be confirmed, and would be of the greatest importance for tropical hygiene. Even on the Island of Mondoleh, near Victoria, which hitherto has been looked upon as healthy, I could confirm the infection in 35 per cent. of the negro children, which could only have been acquired on the island itself, as the children had never left it.

(To be concluded January 15, 1901.)

PLAGUE.—South America seems to be the chief source of danger to the towns on the Atlantic seaboard. Cases from the River Plate have reached New York, Cardiff and Hambury during the past year, and quite recently a vessel from the same locality arrived at South Shields with plague on board.

# British Medical Association.

TROPICAL LIVER ABSCESS.

THE MANAGEMENT OF LUNG LESIONS CONSEQUENT ON LIVER ABSCESS.

By Colonel Kenneth MacLeod, Ll.D., M.D.

Professor of Clinical and Military Medicine, Army Medical
School, Netley.

(Continued from p. 125.)

The question arises, what should be done in these persistent, recurrent or aggravated cases? The reply given in the text book is -establish a direct external drain by incision and insertion of a tube after localising the abscess cavity by aspiratory exploration. The instruction is to search the cavity in the liver and to make the incision and insert the drainage tube through the liver substance. The indication appears to me to be sound, but the method of fulfilling it faulty, and the object of this paper is to urge that the case should be treated as one of lung cavity, and the exploration and incision made into the chest. I formed this opinion upon two grounds, namely, first, that while the pulmonary symptoms are undergoing aggravation, and the lung progressive destruction and excavation, the abscess of the liver is undergoing reparative changes—becoming encysted and contracted and shut off from the rest of the organ by a cicatricial capsule; and second, that I have frequently seen exploration of the liver resorted to in such cases and invariably without success. I have had an opportunity of examining several cases of fatal pulmonary lesion consecutive to and consequent on liver abscess, and have observed the conditions which I have mentioned, namely, active and aggravated lung destruction associated with hepatic abscess exhibiting signs of separation. In these cases the abscess cavity in the liver had become globular, contracted, and encysted, a well-defined capsule or cyst wall of cicatricial tissue enclosing it, surrounded by apparently healthy liver substance. I have detailed two such cases at length in a paper published as an appendix to the Army Medical Department *Report* for the year 1897. In one of these cases the cavity of the liver abscess still communicated with the secondary lung cavity and contained grumous pus; in the other the communication between the two cavities had been closed, and the liver cavity was completely encysted and its contents consisted of caseated pus. The condition in this case resembled what happens sometimes, though very rarely, as a spontaneous method of cure in liver abscess, encysting of the cavity and caseation and finally calcification of its contents. This encapsulation of the liver abscess explains why in these cases it is vain to expect to find in the expectorated material evidences, such as amœbæ, hepatic cells or bile reaction, indicating its hepatic origin, and why microscopic examination of the sputum gives proof of active lung destruction. The stuff coughed up may, indeed, continue to resemble what is chemically recognised as hepatic pus; but I have known material expectorated from lung cavities resulting from empyema pronounced to be "hepatic pus" when there was no lesion of the liver at all. much reliance must not therefore be placed, in diagnosis, on the mere physical characters of the sputum. The contraction of the abscess cavity, in conjunction with its original position, explains why exploration of and through the liver fails in these cases to reach or discover it.

In one of the cases to which I have referred no fewer than seven explorations were made without success, and I have repeatedly seen similar failures occur in other cases. Indeed, I cannot recall any instance in which success attended an attempt to reach the abscess cavity through the liver when it was evident from the history and symptoms that profuse and sustained expectoration of a muco-purulent, or sanious character resulted from a liver abscess bursting

into the lung, and having evacuated through the air passages. On the other hand, in such cases, physical signs of a cavity in the lung will generally be found, and exploration by an aspirator through the chest wall will give positive proof of its existence. This is exemplified by one of these cases, and great relief of symptoms resulted from making a free opening and inserting a large drainage tube. This is the practice which I advocate in cases of this description, in place of vain efforts to broach the abscess cavity through the liver. It has the additional advantage of being the correct and only possible means of surgical relief in cases of encysted empyema eroding and discharging through the lung. When this condition has been established in the right chest it is often difficult, especially in persons who have lived in India and had liver trouble, to exclude the possibility of origin from liver abscess.

My contention is, to sum up the matter in a few words, that in old standing cases of lung lesion consequent on hepatic abscess, the pathological burden has been transferred from the abdomen to the chest; and that relief measures must be applied on that understanding, the lung lesion being treated according to the special indications of

the case, and the liver left to take care of itself.

#### SUBHEPATIC ABSCESS.

By JAMES CANTLIE, F.R.C.S. Surgeon, Seamen's Hospital Society.

By a subhepatic abscess is meant a collection of pus on the under-surface of the liver, between the liver and its capsule, commencing most probably in the lymphatics of this region. The terms I employ in the differentiation of abscess of the liver are three in number: (1) Intrahepatic abscesses mostly of dysenteric origin; (2) Suprahepatic abscesses situated between the layers of the broad ligament of the liver, commencing as a lymphangitis; (3) Sub (or infra) hepatic abscesses, in which the pus lies between the liver substance and the capsule, commencing probably as a lymphangitis. The second and third are independent of intestinal lesions, their pus is "sterile," and Amœbæ coli do not appear in them until some days after the abscess is opened. In one case of suprahepatic abscess empty sheaths of Filaria nocturna were found; it is possible the lymph-angitis may in some instances be due to the results of filarial infection.

I am not prepared to state the cause of, nor to assert why, the pus should select this region. The few cases I am conversant with occurred either in persons who resided in the tropics, or in persons who had visited the tropics at some time shortly before being attacked. It is, so far as I know, not dependent upon dysentery or any ulcerative state of the intestines. It may be malarial in origin, but I have no reason

Any derangement of the liver may be a possible cause. The lymphatic glands at the gate of the liver become affected by material absorbed into them from the liver above and the neighbouring viscera below. Even the melanin deposited in the liver during malarial hepatic infiltration collects in these glands, and thereby hinders their action and chokes their interstices. In such a state it requires but a slight derangement to set up irritation, inflammation, and subsequent suppuration, either in the glands or the lymphatics leading towards them. In subhepatic abscess we have a counterpart of suprahepatic abscess.

At the last meeting of this Association I brought forward clinical evidence of suprahepatic abscess, and I then advanced the theory, and I see no reason for departing from it, at a year's further experience, that it was caused by an inflammation of the lymphatics received from the upper surface of the liver between the layers of the coronary ligament. I ascribe similar pathological changes as the cause for subhepatic

abscess-namely, inflammation of the lymphatics, and possibly the lymphatic glands on the under surface of the liver.

The only single definite feature which can serve as a guide to subhepatic abscess is the presence of a tumour in the epigastrium (along the costal margin) which is found to contain pus, and has for its boundaries the liver above and an inflammatory thickening of the perihepatic tissues around. As this condition can only be exactly elucidated during an operation, clinical evidence can at best do little more than suggest the possibility of such a condition.

In the two or three cases of which I have definite knowledge, the situation of pus was as indicated above. Previous

to operation the local signs and symptoms were:-

(1) A tumour projecting from the anterior margin of the liver to the left of the fundus of the gall bladder and behind the right rectus muscle. The tumour formed a distinct prominence below the edge of the liver and felt like a full gall-bladder, although situated to the right of the position where the gall bladder is usually found.

(2) Perihepatitis with friction sounds showing an increased area from day to day. As the area extends, friction sounds disappear from the centre of the dull area, but continue to spread at the margin, showing the formation of central adhesions and a widening in the perihepatic inflammatory area.

(3) Hepatitis not marked, nor is the area of the liver dulness much, if at all, increased.

(4) The general symptoms are: Increase of temperature by three or four degrees, occasional rigors, generally paresis of the intestine, or, on the other hand, loose bile-stained stools, disturbance of the circulation and of the thoracic movements commonly met with in inflammatory changes in the neighbourhood of the liver.

The positive evidence, however, can only be established during an operation. After an incision into the abscess and the escape of pus, by passing a probe or the finger into the wound the liver can readily be made out above, and also the complete absence of any resistance below which could suggest liver being there. In case this evidence is not considered satisfactory, I have, however, more convincing proof of the situation of the pus being what I have described. Whilst discussing this matter with Sir Lauder Brunton, not only did he say he was convinced of the possibility of a subhepatic abscess, but had actually seen one in his own practice where, during a laparatomy made for diagnostic purposes, a large subhepatic mass of pus was found to extend along the under surface of the liver from the anterior to the posterior border. The pus lay between the peritoneum and the liver substance, and had only peritoneal and inflammatory thickening around it except above.

The diagnosis of subhepatic abscess is not unattended with difficulty. Gall-bladder inflammation is most likely to be mistaken for the abscess, seeing that the relation of both to the anterior abdominal wall is almost identical, and that the hepatic symptoms in both are pretty similar. gnosis must rest for the most part on the history of the case, but when this is unobtainable the surgeon must be prepared when about to operate to deal with either condition. The pus from the abscess possesses but little resemblance to liver pus; it resembles rather ordinary creamy pus from an

abscess elsewhere in the body.

Prognosis.-Of the few cases I have seen, the prognosis is good, no death having occurred. One man, the captain of a ship sailing between Hong Kong and New York, left nine days after the abscess was opened with a drainage tube in the cavity of the abscess. In the case mentioned by Sir Lauder Brunton the pus was so extensive that an opening was made behind as well as front to ensure proper drainage. This has not been necessary in the cases within my personal experience.

Treatment.—The treatment of this form of abscess presents nothing peculiar. Tapping by a large trocar and drainage by a large tube has proved satisfactory in my hands; but incision when adhesions are known to have formed is free from danger, and in the one case in which I have seen it practised it proved eminently satisfactory.

THE DEPTH TO WHICH IT IS SAFE TO PUNCTURE THE LIVER.

Mr. Cantlie demonstrated the position of the inferior vena cava in reference to its distance from the surface of the body. He stated that by a study of frozen sections it is possible to ascertain how deep the needle of the aspirator or the trocar and canula can be carried into the liver without causing untoward consequences from hæmorrhage. He finds in a body with a circumference over the hepatic area of 32 inches that the centre of the inferior vena cava is from 41 to 5 inches off the surface, in a line drawn horizontally from the neighbourhood of the xipho-sternal articulation to the angles of the ribs behind. Before commencing an exploratory puncture of the liver, therefore, Mr. Cantlie recommends that the circumference of the body be taken, and starting with the above measurement as a basis, a fairly accurate idea of how deep the puncture may be carried is ascertainable. In a body measuring 32 inches in circumference, it is not safe to penetrate deeper than 3\frac{3}{4} inches in a horizontal direction from anywhere in the line mentioned. For every inch of circumferential measurement above or below the 32 inches, 4 inch may be added to or subtracted from the depth it is safe to penetrate. Abstraction of blood in inflammatory hepatic derangements Mr. Cantlie regards as most salutary. When the needle enters a large vessel in the liver substance, as judged by the free flow of blood in the bottle, he allows the needle to remain until 6 to 10 ozs. of blood are withdrawn. No ill effects follow tapping a vein in this position: it is only when the inferior vena cava, or the trunk of the portal vein before it breaks up in the liver, are wounded that dangerous hæmorrhage is likely to follow. puncture of the liver by a needle causes a slight or even considerable flow of blood subsequently into the peritoneal cavity, as he had been able to prove clinically; but in all probability it was this very flow of blood which contributed to the marked benefits usually following liver puncture. The dangers of hepatic hæmorrhage are confined to puncturing the inferior vena cava, the extra-hepatic portion of the portal vein, or penetrating a mass of malignant tissue occupying the liver.

# THE DIAGNOSIS AND SURGICAL TREATMENT OF TROPICAL LIVER ABSCESS.

By Wm. Johnson Smith, F.R.C.S. Surgeon Seamen's Hospital, Greenwich.

It can hardly be questioned that during the last quarter of a century the prognosis of certain morbid conditions of the liver has been much improved, and with regard especially to the so-called tropical abscess of this organ, operative treatment by the increased efficiency of its results may be regarded as a satisfactory example amongst many of the recent developments and advances of abdominal surgery. Moreover, there can be no doubt that of late years not only has the surgical treatment of hepatic abscess improved, but that also, in consequence of a better appreciation and a more active application of surgical methods of diagnosis, the proportion of such cases brought under the surgeon's care whilst still in favourable conditions for operative treatment has considerably increased. Waring's well-known analytical work, published in 1854, is a pathological rather than a clinical record of most of the 300 cases with which this author dealt. In only eighty-one of these cases had any operation been performed, and in these cases, notwithstanding in a large proportion the very ele-mentary and simple nature of such treatment, the mortality was not less than 81 per cent. Such results as these would certainly justify the very unfavourable judgment of Lafleur on surgical intervention summed up in the sentence that in amæbic abscess of the liver there is slender hope of recovery after operation; but surely so recent and able an authority on this subject might be induced to reconsider this statement by the much more favourable records of later statistics. As a fair example of these, I might allude to a recent com-

munication on the treatment of hepatic abscess by Malbot, a French surgeon, who has had much experience of this disease in Algeria. This author, at the end of last year, published 19 cases under his own observation, 8 of which were treated by transpleural incision and 11 by laparotomy, with a total mortality after both methods of 33 per cent. In a report I drew up about five years ago of the cases of hepatic abscess treated in the Seamen's Hospital from 1870 to 1895, I found clear indications of the increasing tendency during late years to submit such cases to surgical attention, and whilst during the first twenty years of this quarter of a century 8 cases only out of 37 were treated by an operation which in most instances consisted in a simple incision of a prominent swelling on the right hypochondrium, in the course of the last five years 9 out of 13 were surgically treated, 8 by transpleural incision with resection of a portion of a rib, the remaining single case by laparotomy. There is no necessity, I believe, at the present day, to anticipate any serious questioning of the absolute necessity of bringing under surgical notice any case of supposed tropical or amebic abscess of the liver. The spontaneous cure of such a condition, even though the collection be a very small one, is very problematical; and though perhaps for the subject of such disease spontaneous rupture through the lung may be the happiest event, one must not forget that while waiting for such not improbable result, the abscess may extend in a much less favourable direction. The need for surgical aid in cases of supposed liver abscess is necessary, not only for strictly therapeutical purposes, but also in a large proportion of cases for the sake of obtaining a certain and precise diagnosis. Except in those cases forming, I believe, a small minority, in which the abscess forms well-marked tumour in the right hypochondrium, the determination in the first place of hepatic suppuration, and in the second place, if this be assured, of the localisation of the disease and also of the existence of one or a plurality of collections, is almost always attended with more or less difficulty. There can be no doubt that most subjects of hepatic abscess present a collection of very suggestive symptoms, but such symptoms, usually not more than suggestive, are to be regarded as signs of probability and not of precision.

The physician, and especially one who has had a large experience of such cases abroad, cannot as a rule say more after a review of strictly clinical symptoms than that the patient ought to have an abscess of the liver; but still, on the strength of such an opinion, however authoritative it may be, one would naturally hesitate before exposing the patient to an operation involving exposure of pleural or abdominal cavity, or both these cavities together. This uncertainty in the clinical diagnosis of hepatic abscess is mainly due to two causes: in the first place, most of the symptoms given in the textbooks as indicative of this affection are met with in other morbid conditions of the liver, and, in the second place, they are often associated with and marked by those of dysentery and malaria. The temperature is not a good guide, as it is often very irregular, and in severe and advanced forms of the disease is low and even subnormal. Shoulder-tip pain, though more frequently present than seems to be generally supposed in cases of liver abscess, may be absent, and moreover, when present cannot be relied upon. Rigidity of the rectus may be due to disease of intestine or some other abdominal organ, or even of the muscle itself. Of all the suggestive signs of the disease localised tenderness over some part of the surface of the liver is perhaps the least unsatisfactory. The results of chemical examination of the urine do not seem to have given any reliable results, even in cases in which a considerable amount of liver structure has been destroyed.

Fresh aids to diagnosis have been brought under notice from time to time, but hitherto these have failed to afford much help. Attention has of late been directed to the occurrence in cases of liver abscess, especially when involving the posterior and upper part of the right lobe and encroaching on the diaphragm, of what is called functional

dyspnœa, by which term is implied exaggerated movement of the thoracic wall without any other indications of intrathoracic mischief. Such a condition, however, even though of frequent occurrence in association with liver abscess, which, I am inclined to think, is far from being the case, may be due to direct irritation of the diaphragm or any painful affection in or about the liver, and thus will fall into the list of indications that are more or less uncertain. Then, again, help has been invoked from a rather unexpected quarter, and an attempt made to extend in this direction the utility of the Roentgen rays. Loison, in a recent paper on the treatment of hepatic abscess, states that in several cases of this affection he has gained much assistance from skiagraphy. If, this surgeon states, a healthy subject be placed before the fluorescent screen, the shadow presented by the diaphragm will be seen undergoing rhythmical movements of rise and fall under the influence of respiration. This shadow, it is asserted, shows a difference of level on the two sides, the most elevated part of the vault of the diaphragm being about  $1\frac{1}{4}$  inch higher on the right than on the left side. In cases of hepatic enlargement this difference is still further increased and the right half of the diaphragm no longer moves. In effusion into the right pleural cavity, on the other hand, the convex shadow of the corresponding half of the diaphragm is no longer visible, and all that can be discerned is a horizontal line indicating the level of the effusion. This diagnostic method surely requires the aid of an expert, and cannot, it seems to me, do more under the most favourable conditions than assist the not very difficult diagnosis between pleural effusion and

an enlarged liver. The strictly clinical signs of liver abscess as given in textbooks vary considerably in diagnostic importance. Whilst some can give very little, if any, certain help, others, especially when present in full force, might fairly justify the conviction that there ought to be an abscess somewhere in the liver. The key-note, of course, to our diagnostic scale is previous residence in a hot country, and a previous history of dysentery or chronic diarrhea is of much importance. From my own experience, which, though extended over a long period of time, is relatively very small, I have been led to look upon an association of most or all of the following clinical data and signs as urgent indications for prompt investigation by surgical means of the condition of the liver. The patient, whom we will assume is between 25 and 45 years of age, has resided in a hot country, and has suffered whilst there from dysentery. There is tenderness over the liver varying in extent from time to time, but always most marked at one spot. There is decided and troublesome shoulder-tip pain, and well-marked signs of gastric irritation. The patient is emaciated, presents a peculiar sallow, though not jaundiced hue, and is depressed in spirits and mentally torpid. The temperature is irregular, though showing more or less tendency to the remittent type. There is, I believe, in cases of liver abscess a decidedly characteristic position, the patient lying on his back with the chest raised and the lower limbs slightly flexed. Of course we must expect to find a more or less extended area of hepatic dulness, but, except with large abscess, this may not be readily appreciable. The difficulties in diagnosis by medical methods of observation, as might be anticipated, vary in accordance with the abscess. If, together with other clinical indications, the patient presents in the right hypochondrium a fluctuating swelling over the most prominent part of which the skin is ædematous and congested, nothing can be more simple, but, unfortunately, such cases are in a minority. The most difficult of all are the very rare instances in which a small single abscess is situated in the left lobe of the liver. There are two further methods of diagnosis by which alone, in most cases of liver abscess, the uncertain can be made certain, and the indications hitherto regarded as uncertain and merely suggestive can be surely confirmed. The surgeon, when called upon to assist in justifying any further steps for operative and radical treatment, has to decide between exploratory puncture and exploratory laparotomy. For my

own part, I prefer the former, as I have almost always seen it applied with success in cases of abscess, and have never witnessed any bad results from its use. Objections have, however, been made to the needle and the syringe from time to time, and there seems now to be a tendency in some quarters to resort at once and exclusively to exploratory abdominal section. The latter procedure, there can be no doubt, if performed with proper precautions and with proper care, is a safe operation, and surely the same may be said of the much less alarming and troublesome procedure of exploratory puncture. Laparotomy under the most favourable conditions has certain inconveniences and after-troubles; I am speaking of it now simply as an aid to diagnosis and as an alleviative measure which ought to be taken into consideration. It necessitates the administration of an anæsthetic, causes much anxiety to patient and to patient's friends, and may result sooner or later in a tendency to ventral hernia. I much question whether laparotomy can in the majority of cases afford us more help than simple puncture. The liver, from our present point of view, is to be regarded rather as a thoracic than as an abdominal organ. The posterior part and upper part of the right lobe may be felt but cannot be seen, and the route to the seat of the supposed abscess may be barred by adhesions which it would be imprudent, if not dangerous, to break down. Even if this exploratory procedure reveal to us the situation of the abscess, it will usually fail to give any further assistance, as in the subsequent plan of treatment it will be found necessary to attack the seat of the disease by the same methods and the same direction as when the presence of pus has been revealed by a simple puncture. Moreover, and this I take to be a strong, though it may be a sentimental objection to laparotomy as an exploratory measure, there is the probability that the exposed and handled liver

may be found to be quite healthy.

I must confess that I see no good grounds for opening the abdomen simply as an exploratory measure, unless, notwithstanding the presence of high fever and localised pain, and other very suggestive symptoms of abscess, the repeated use of the needle and syringe has failed to reveal the presence of purulent fluid. It would be difficult, I think, without laparotomy to find out a small abscess in the left lobe, and it is in a condition of this kind only, which occurs only in about one case in fifty, that I have myself opened the abdomen and seen it done by one of my colleagues. Exploratory puncture by needle and aspirating syringe is, I believe, an almost perfectly safe procedure, provided that in this as in other operations, whether minor or major, we use a suitable instrument that is in proper working order and thoroughly sterilised. I have generally seen used a syringe capable of taking from 60 to 120 minims of fluid, and a hollow needle from 3 to 6 inches in length. I see no advantage in using any of the larger aspirators, such as Dieulafoy's or Potain's, as they are more complicated than the simple needle and syringe, and are liable to break down at the most critical point of our exploration. Simple puncture with aspiration is, I feel sure, not only a safe but a very efficient aid to diagnosis. If the needle be introduced at a bulging spot over any part in front of the liver, or at some point of extreme tenderness, or into a widened and cedematous inter-costal space, it will seldom fail to reveal the presence of pus; and if a series of from one to half-a-dozen punctures made within the area of hepatic dulness from the front to the back of the chest give no result, there will be a strong probability that the right lobe of the liver at least is not the seat of any purulent cavity. In case of failure, should the symptoms of liver abscess with high fever, sweating, and exhaustion still persist, we may after an interval of a few days again try the needle and syringe, and if these still fail, resort at last to an exploratory laparotomy. If, as is usually the result after two or three punctures, the characteristic fluid of a liver abscess be drawn up into the syringe, an operation for giving free discharge to such fluid and exposing and draining the interior of the cavity should be practised immediately. If the patient be anæsthetised

during the puncturing process, it would be very advisable to complete the operative treatment at what the French call the same sitting. This I believe to be a point of much practical importance with regard to the safety of the method of exploratory puncture. The soft parts between a liver abscess and the surface of the body may be ædematous and congested, or in consequence of some leakage of pus, either antecedent to or actually caused by the introduction of the needle, may be sodden by the discharge, and in consequence of either of these conditions may, if not relieved by free incision, become the starting point of serious septic mischief. Moreover, if we have struck an abscess in the liver, it would be well to take full advantage of the information thus obtained, and to follow at once the track of the needle. have known instances in which a second puncture made at the same spot after an intermission of some hours has, in consequence probably of some difference in the position of the patient, failed to give the same result—a cause of some embarrassment to the surgeon, who in operating for liver abscess ought, I think, to make it an invariable rule never to make a deep and free incision unless he is quite sure of the existence and precise situation of his object. The existence of an abscess having been determined, it is the usual practice to substitute the scalpel for any variety of puncturing apparatus, and to have recourse according to the stiuation of the cavity either to thoracotomy or some form of abdominal section. Thoracotomy, I believe, almost always implies a transpleural incision. When we have to deal with I cannot see how, in the absence of adhesions, it is possible to approach the cavity without opening the pleural sac on the right side. The methods devised by Lannelongue and other French surgeons, of attacking the upper surface of the liver by a partial resection of the lower margin of the thoracic cage are not, I think, very satisfactory. I have tried Lannelongue's operation repeatedly on the dead subject, and found it very difficult to carry it out without making a free communication between the pleural and peritoneal cavities. Every surgeon who has had experience in the treatment of hepatic abscess must, I have no doubt, have often wished to discover a direct passage to the back of the liver. The transpleural operation is theoretically a most unpromising and indeed a risky one. In my experience, whilst with abscess in front necessitating an abdominal operation, we usually meet with adhesion in attacking the more frequent form of posterior abscess from behind, we so often find both the lung and the liver quite free and their respective serous cavities quite open. Consequently, in this operation we expose two large serous cavities and so double the risks of infection. Then again, there is usually, though not always, a difficulty in preventing ingress of air into the pleural sac and collapse of the lung. Still, notwithstanding these causes of danger, the transpleural operation in suitable and favourable cases has, on the whole, been a satisfactory one, perhaps more satisfactory than any cutting operation for liver abscess. In Malbot's list of cases, to which I have already referred, whilst four deaths occurred in eleven in-stances of abdominal or anterior operation, a mortality of about 36 per cent., of eight cases of transpleural operation two only were fatal. In the transpleural operation after removal of a portion of the seventh or eighth rib the dia-phragm is often found so far elevated and pressed upwards as to bulge into the wound and thus to prevent the passage of external air into the chest. The surgeon's chief care at this stage is to guard against the risks of subsequent infection of pleura and peitoneum. I have myself usually followed the not infrequent practice of making a free incision of both diaphragm and liver, so as to allow a full and uninterrupted discharge of the fluid contents of the abscess. Such a course has, I believe, been very frequently followed by many surgeons without bad results, and it is one that from a strictly technical point of view has its advantages. Sooner or later, however, one might have to regret a constant and indiscriminate practice of this kind, and meet with an unfortunate exception to the rule that the contents

of a liver abscess are absolutely sterile. Great caution ought naturally to be exercised in cases of mixed infection, and when the patient presents symptoms suggestive of some form of septic poisoning. It would be well, I think, in every case of doubt—and, indeed, in every case of liver abscess—to apply our tests for both general and local leucocytosis. The puriform fluid withdrawn at the exploratory puncture should be examined under the microscope before further steps are taken by the surgeon, who, if he learns that leucocytes are present, should make it his endeavour to shut off both the right pleural and the abdominal cavities before he opens and empties the cavity in the liver. This stage of the operation has, I venture to suggest, both difficulties and uncertainty. I have not much faith in suturing. This is not only a long and tedious, but also, I believe, a very unsatisfactory procedure. After the most careful stitching, whether of parietal pleura to diaphragm or of diaphragm to liver, one often sees gaps here and there, and even the closest application of two margins or two narrow zones of serous or muscular tissue may, if the contents of the liver abscess be very virulent, fail to prevent an infective pleurisy or peritonitis. The course I would myself prefer in any doubtful case would be an application of Volkmann's method by plugging the open wounds in the chest wall and diaphragm with sterilised or antiseptic gauze, and postponing for two or three days—if such delay were free from risk—the final stage of the operation.

I will not say much concerning the operative treatment of a liver abscess revealed by puncture of the anterior wall of the abdomen. In such cases most surgeons, I believe, would practise abdominal section, which would usually be one of a somewhat limited extent. This, from a technical point of view, would be a simpler and more satisfactory operation than transpleural section, as we need not open more than one serous cavity, and very probably, in consequence of the frequent if not almost invariable presence of adhesions, may pass the knife directly into the abscess without any exposure

of the peritoneal cavity.

Before concluding I might state that the surgeon has a free and wide range in the treatment of abscess of the liver. I see no reason why he should not operate in cases in which the patient is still suffering from dysentery, but this is a question for the physician to decide. The coexistence of two or more tropical abscesses need not be a contra-indication, as instances have been recorded, and I have had one such under my own care, of successful operations on three distinct cavities. The only cases in which I would refrain from operating, excluding those in which the patient is much exhausted and almost moribund, would be cases in which there were clear indications of a spontaneous rupture of the abscess into the right lung.

In concluding this paper I think that I may fairly assert that surgeons in this country, by adopting the methods and following the teaching of their much more experienced colleagues abroad, have succeeded in improving to a considerable extent the prospects of operative treatment in cases of

tropical abscess of the liver.

The Relation of Dysentery to Malaria.—Drs. S. Kanellis and J. Cardamatis, of Athens, publish the results of their investigations on dysentery in relation to malaria. Their conclusions are: (1) that so-called pernicious dysentery is not caused by any one particular organism; (2) dysentery is not primarily caused by malarial infection; (3) although malaria may produce an intestinal flux, the two diseases may run concurrently, but independently, of each; (4) dysentery should be eliminated from the list of sequelæ attributable to malaria.—Progres Médical, May 19, 1900.

## Current Miterature.

#### MALARIA.

Professor Koch has completed his tour in different parts of the world, which he undertook for the purpose of studying malaria and other tropical diseases. Professor Koch affirms that in Egypt malaria is endemic in the Delta of the Nile—a fact which has been frequently contested.

Mosquitoes in the Arctic Regions .- Dr. Irving C. Rosse, in an article on mosquitoes and malaria, mentions that in Arctic regions life is rendered almost unbearable by the bites of legions of mosquitoes, yet neither the natives nor travellers ever suffer with malaria. This, however, proves nothing except perhaps that the mosquitoes were not anopheles, or if anopheles they were not injected with malarial germs. Probably also the Polar regions are not suitable for the development of malaria, or it may be that its power is shaken by the intense cold. Dr. Rosse spent some time at the mouth of the Delaware, and also in Monte Carlo and other malarial districts. these places he and his companions were bitten by mosquitoes, yet not one acquired malaria. It may be, however, that "exceptions prove the rule"; moreover, so many factors play a part in the transmission of disease, such as the constitution of the individual, and his predisposition to illness, that no precedent can be drawn from the facts called attention to by Dr. Rosse.—Boston Med. and Surg. Journal.

Notes on Mosquitoes (by the late Miss Charlotte Hanbury).—Travelling in many lands infested with mosquitoes taught me the necessity of having constantly at hand a complete protection against them. The most effective plan for head and neck is mentioned by Sir John Hay in his "Western Barbary." He used a bonnet and veil, but I am persuaded that the best thing is a crinoline hat, cut away behind in the neck and with sufficient veiling that is fine, but cool, to envelop every part of the head, neck and shoulders, thus making a complete defence that can be always ready. It must go flat in any bag and come out only for its work to keep the veil far away from one's self. It takes scarcely any room, and with its trimming bears all crushing. Before knowing this remedy when at the islands on the West Coast of France—Rey, Oleron, &c.—I encountered giant mosquitoes quite unprepared. They hummed like small trumpets, and forced me to do something. Happening to have some gutta percha tissue, I cut a large mask with very small eyes, nose and mouth, and well tied on; it answered perfectly, being cool, but quite impervious to their sting. In vain they buzzed loudly and sought an entrance—the attacks were baffled. It requires another covering for the neck and shoulders. When in swarms of gnats, &c., biting ankles, disturbing hours of rest in the evening, it is a great relief to have a cool loose bag at hand to enclose feet and ankles safe from all reach. We frequently rode into tracks beset with flies so painful to animals; our attendant said they would kick everything off their

backs if stung. The horses and mules knew the enemies around, and sought to keep their noses stretched down to the sand. Wishing to escape the agitation that was beginning, and especially the general kicking, I had fine good net secured round their faces which removed the whole trouble.—Climate, January, 1901.

#### TYPHOID.

TYPHOID FEVER IN SOUTH AFRICA.—It was stated recently, in reply to a question in Parliament, that there had been 15,625 cases of typhoid fever among the British troops in South Africa, and that of this number 3,642 proved fatal.—Med. Record, December, 1900.

THE TREATMENT OF TYPHOID FEVER AT THE NEW YORK HOSPITAL.—By Dr. Frederick L. Keays. Baths are given every three hours, after the temperature reaches 103° F. The bath is started at a temperature of 80° F. and diminished in the two or three following baths to 70° F. Moderate degrees of cyanosis or shivering are not considered contraindications. Warm milk is given and hot-water bottles placed at the feet, if the blueness and shivering continue. When tub baths are contraindicated, alcohol sponges are substituted for the baths, the alcohol being cooled by ice. A modification of this is to have one person sprinkle the patient's body with alcohol, by means of a whisk broom, while another hastens evaporation with a fan.

Sodium bromide, from 15 to 30 grs., phenacetine, and acetanilide are used to relieve the headache appearing in the first weeks of the disease. The ice cap is also used. Trional, from 10 to 20 grs., given in hot milk is used as a mild hypnotic. Each patient is ordered a mouth wash, made by adding tincture of myrrh, 1 drachm, and sodium bicarbonate, 30 grs., to water, 4 ozs. This prevents such complications as parotitis and otitis media. Calomel and saline purgatives keep the bowels open in the early stages of the disease. When whisky or brandy fail to hold the pulse, strychnine sulphate is used, and if still more stimulation is needed, digitalis is given. Bronchitis is disregarded, unless it is extensive or troublesome, when the ordinary remedies are employed.

Milk is the routine diet. A little brandy or a few spoonfuls of coffee, or some malted milk, is added if plain milk is not acceptable. Kumyss or matzoön is substituted from time to time for variety. Patients who complain of hunger receive broths and beef juice, and when the temperature becomes normal, more active feeding is begun.

A Few Remarks Relative to Typhoid Feeding.—By Dr. William M. Brown. The author advocates the more liberal feeding of typhoid patients. The functions of digestion are attended by heat production, and proteids and carbohydrates giving the least number of heat units, while promoting the most effective digestive fluids, should be given. Milk unprepared is not a liquid food and will take as long to digest as many solid foods.—New York Medical Journal, December 8, 1900.

#### MISCELLANEOUS.

THE MICROBE OF CEREBRO-SPINAL MENINGITIS .-According to the Thèse de Paris, 1900, no single specific microbe is recognised for cerebro-spinal meningitis; infection may be produced by different pathogenic agents. In France the meningo-coccus of Weichselbaum is believed to be the actual etiological

Frambœsia (Yaws).—In the Caroline and Marianne Islands in the Pacific Archipelago, Koch, from the examination of a number of children, has come to the conclusion that malaria is not endemic there, but that frambæsia (yaws) is very prevalent. — Deut. Med. Wochenschrift, No. 46.

MOSQUITOES COMMUNICATE YELLOW FEVER. - A board of medical officers of the War Department in Cuba have, according to their report to Surgeon-General Sternberg, demonstrated that yellow fever is spread through the bite of the mosquito. One of the board died as a result of the experiments. The board consisted of Dr. Walter Reed, surgeon U.S. Army, and Dr. James Carroll, Dr. A. Agramonte and Dr. Jesse W. Lazear, acting assistant-surgeons. During the experiments Dr. Lazear was bitten by a mosquito that had previously bitten a yellow fever patient. The doctor died of that disease after a short illness. Dr. Carroll allowed himself to be bitten by a mosquito that had previously fed on several yellow fever patients and suffered a serious attack of the disease. A civilian resident of the military reservation, a young American, whose name is not given in the report, was bitten by the same mosquito that bit Dr. Carroll and died of yellow fever. New York Medical Journal, December 8, 1900.

How the Chinese Doctors Feel the Pulse.—It is well known that Chinese doctors attach great importance to the condition of the pulse and the study thereof. The following is the usual procedure: -The patient is made to lie down with his arm resting on a cushion. The doctor, seated by him, applies his fingers successively in order to judge of the compressibility of the artery. The number of pulsations is then compared with that of the inspirations and expirations. The Chinese doctors compute that four beats of the pulse should take place to one breath, to indicate normal health, and a greater or less number is reckoned as a sign of illness. They establish four sub-divisions for the pulse. According as the same is superficial, deep, quick or slow, it corresponds to four temperaments, choleric, hopeful, phlegmatic, or melancholic. Curious details in regard to Chinese and Mongolian medicine will be found in Mr. Matignon's recent work "Superstition, Crime and Misery in China."-Dr. L. Salvy, Janus, December, 1900.

Dr. K. Shimizu, of Japan, highly recommends an infusion of cassia occidentalis as a prophylactic for stings of insects and snake bites, the infected parts to be bathed with this lotion.—Janus, December, 1900.

THE POVERTY OF TROPICAL COUNTRIES AS A CAUSE OF THE FEEBLENESS OF THE NATIVES, by F. Lemeleder,

M.D., Cordoba, State of Vera Cruz, Mexico.—All men dream of the marvellous riches of the tropics, of the birds with rainbow plumage, of the extravagant flowers, of the elegant tree ferns, of the banana and palms with waving leaves, and of the cocoa palm which furnishes man with everything necessary for Indeed, we pity him who has never seen a tropical landscape, as we pity him who has never seen the sea. Then we think of the enormous treasures the English, Spaniards, and Dutch have harvested from their tropical colonies, and naturally we think that the tropics are the richest regions of the world. All this may be true, yet nevertheless, in another sense, instead of being rich, the tropics are fatally poor. Unable to secure the necessaries of life, the people of tropical countries are like the man in whose hand everything turns to gold, yet who perishes of hunger and thirst.

Of all the breadstuffs necessary for man, the tropics furnish only corn and rice, and these only to a limited extent. They have no wheat, rye, or potatoes. The banana may be, as Humboldt says, one hundred and thirty-three times more productive than wheat and forty-four times more so than potatoes, yet it cannot replace either as food. Nor can white men live for any length of time on rice and corn alone, nor on bananas and palm nuts. Native tropical foods can only hold body and soul together, as they furnish but little vigour, energy and power. No machine can do good work with poor fuel. A man who has neither bread nor meat cannot get life and strength and push from tea, coffee, sugar, vanilla, and all the precious spices. Tropical products are merely commercial luxuries, and if the inhabitants of cold climes did not buy them the people of the tropics would lack the necessaries and comforts of life and would yet choke with their own riches.

If we wish to know the effects of the poor diet of the tropics combined with the effects of the heat, we have only to look at the inhabitants of these countries. As a general rule they are thin, poorly built, and unfit for intellectual or physical labour. Occasional exceptions will only confirm the rule.

Even the foods which are produced are insufficient in amount, so that the least interference with the annual crops results in famines, as is the case in India to-day. Indeed India has always been the land of fabulous riches of a few and of famines of the millions. Until recently in the cold countries there were none

of fabulous wealth and but few famines.

Everything in hot countries is harmful to man; the ground, the water, and the air, swarming with miasms and vermin, and with torment and danger. Life is as much a torment as a pleasure, for whatever makes life worth living is lacking. They depend for indispensable necessaries upon the temperate zones, to which they furnish only the luxuries.

Some one may mention the art, science, and culture of Hindostan, Ceylon, Java, and the tropical Americas. These were possible when the Aryans and other conquerors who had come from the colder countries had still preserved their original vigour and energy before they mingled with the former inhabitants and degenerated. Then we ought not to forget that all these great works were done when the

great institution of slavery placed tools in the hands of the conquerers to do work they themselves could not do in the heat. In our day, it is machinery, the great liberator of man, which does the work performed in those remote ages by the hundreds of thousands of miserable slaves.

The temperate zone is the one which breeds everything grand, and of these countries, and not of the tropics, Goethe sang,

"Nach der Wärme ziehen sich Musen,

Nach der Wärme Charitinnen." Lord Macaulay, in his essay on Warren Hastings, Edinburgh Review, October, 1841, p. 174, in discussing the prevalent ideas of the wonderful riches of the Indies, said, "Nobody seemed to be aware of what nevertheless was most undoubtedly the truth, that India was a poorer country than countries which in Europe are reckoned poor; than Ireland, for example, or than Portugal. It was confidently believed by lords of the treasury and members for the city that Bengal would not only defray its own charges, but would afford an increased dividend to the proprietors of India stock and large relief to the English finances. These expectations were disappointed." Are not the people of the United States to be disappointed in the Philippines?—From the Medical Record, Dec. 22, 1900.

THE SOLDIER'S TROPICAL RATION.—(In an editorial this subject is dealt with in the Medical Record.) In the present conjunction of affairs, everything relating to the tropics concerns the inhabitants of the United States intimately. Thus the etiology and treatment, both preventive and remedial, of the diseases prevalent in those regions are questions of serious moment. All that can be learned with regard to the mode of life best suited to the preservation of the health of white men who make their home in tropical countries is devoured with avidity. Under existing circumstances the army in the Philippines is the focus of absorbing interest. Therefore the Report of the Board appointed to study the matter of tropical ration for American troops, and to suggest beneficial changes therein, will be attentively read by the general public. It goes without saying that diet is one of the most important of considerations when the rendering of a white man able to cope with his unaccustomed environment is the object in view. On this point opinions clash. There are those who insist that under no conditions can the inhabitant of the temperate zone dwell in perfect health in tropical lands. On the other hand, many men of experience state that, if these individuals live in a manner befitting the climate, paying strict heed to the laws of hygiene, and if, above all, they are discreet in eating and drinking, there is no valid reason why they should not enjoy good health. So far as the kind of food is concerned, a wide divergence of views exists. Some argue that an entirely different dietary is indicated in tropical countries, and that the person who imagines that he can thrive on the same description of food that he eats when at home, will be certain quickly to break down. Others assert that but a slight change of diet is needed from the ordinary fare of an American in his own country, and that if the stranger in the tropics endeavours to live as does the native, he will soon lose both energy and physical power. Major Louis Seaman, late surgeon in the United States Engineers, is an upholder of the former contention, and writing to the Medical Record, says, "A personal experience in two of the latest tropical wars, and a study of the statistics of others, have led me to the conviction that the most prominent cause in bringing about the development of preventable diseases in both these wars was the misuse of food." Speaking generally, he considers that the majority of the diseases met with among troops serving in the tropics have their origin in improper food, in overfeeding, or in the abuse of stimulants; and he suggests a dietary scale containing much less meat and fat than was issued to the United States troops. Dr. Seaman is of the opinion that the ration was an excellent winter food, rich in the elements requisite for respiration under a low temperature; but for a tropical land, the enormous excess of carbon furnished by it to the lungs over and above that which they could dispose of, imposed upon the liver and kidneys additional duties of elimination, producing congestions, fermentation and catarrhs, dyspepsia and lithæmia, glycosuria and phosphaturia, interfering with metabolism, and creating conditions favourable to bacterial development, together with almost the entire train of diseases which have crowded our army hospitals. As remarked above, many medical men who have gained experience from a lengthened sojourn in the Philippines hold that meat is a necessity for the American soldier, and that, lacking it, his bodily powers will fail. The Board have cautiously steered a middle course, and while recommending that the fresh meat ration should not be reduced in quantity, declare that the problem is to find such a ration as will, by substitutes among its various ingredients, be suitable for all climates. Corn meal has been excluded from the ration, as have dried peas, for the latter of which oatmeal has been substituted. The sugar ration, as in all European armies, has been increased, and coffee has been retained. The action of the Board appears to be amply justified and will probably meet with the approval of the majority of those who have spent some time in the tropics. Fresh meat, fresh vegetables, fresh fruit, supplied in sufficient quantities, should tend to preserve the health of the dweller in tropical countries, and wherever obtainable will undoubtedly meet the exigencies of the situation better than embalmed meat and canned vegetables. Universal agreement prevails on the point that alcoholic drinks are almost invariably injurious to the white man in the tropics. It may be said that when the problem of the most healthy diet for the foreigner in the tropics is solved, the greatest obstacle in the way of rendering these countries salubrious will have been overcome.

TÆNIA FLAVOPUNCTATA. - Frederick A. Packard describes a parasite taken from a Syrian woman aged 40. One specimen was passed during life and another was taken from the intestine after death; the latter was 27 cm. long and different from the former specimen in no way except by the presence of the head and of a short neck, and by its colour. The specimen passed during life was brownish-yellow, 20

while that found at autopsy was almost pure white with a faint yellow tinge. This specimen consists of a head and a short neck separated by a slight constriction, and of a segmented body. The head is black at the tip, the pigment being arranged somewhat like the leaves of a four-leaf clover, as though each division represented the sucking-discs seen in other tænia. No distinct cupping is visible. At a distance of 1.5 cm. from the head, distinct transverse striations are seen, which evidently indicate division into proglottides. There is no branched arrangement of the egg-sacs nor any central clumping as in the bothriocephalus latus. This cannot be a tænia common to this part of the world, nor is it an example of bothriocephalus. It must, the writer believes, be a specimen of tænia flavopunctata which has been described but six times as occurring in the human subject.—Med. Record, December 27, 1900.

#### DYSENTERY IN CHILDHOOD.

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E.—Dr. P. G. Edgar (Perak). F.—Staff-Surgeon R. A. Fitch (Port Elizabeth).

G.—Dr. F. Oscar Guérin (Mauritius); Dr. J. C. Graham (Deli).

H.—Dr. W. C. Hossack (Calcutta).

J.—Lieut.-Col. J. M. Jones (Punjaub).

M.—Dr. A. Yale Massey (Benguella); Dr. A. Morrison (Alexandria).

O.—Major P. W. O'Gorman, I.M.S. (Lyallpore). R.—Dr. W. N. Robertson (Queensland).

W.—Dr. E. G. Williams (Boreham Wood); Sir Francis P. Winter, C.M.G.

#### EXCHANGES.

Annali di Medicina Navale.

Archiv. für Schiffs u. Tropen Hygiene.

Archives de Medicine Navale.

Archives Russes de Pathologie, de Medec., Clinique et de

Bacteriologie.

Australasian Medical Gazette. Boletin de Medicina Naval.

Boston Medical and Surgical Journal. Bristol Medico-Chirurgical Journal.

British and Colonial Druggist.

British Journal of Dermatology.

British Medical Journal.

Climate.

Clinical Journal.

Clinical Review.

Giornale Medico del R. Exercito

Hongkong Telegraph.

Il Policlinico.

Indian Engineering.

Indian Medical Gazette. Indian Medical Record.

Journal of Balneology and Climatology.

Journal of Laryngology and Otology.

La Grèce Médicale. Lancet.

Liverpool Medico-Chirurgical Journal.

Medical Brief.

Medical Missionary Journal.

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New York Medical Journal.

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- 6.—Correspondents should look for replies under the heading " Answers to Correspondents.'

# The Journal of Tropical Medicine.

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# Original Communications.

#### CASE OF RHINORRHŒA.

CILIATED ORGANISMS MET WITH IN THE DISCHARGE.

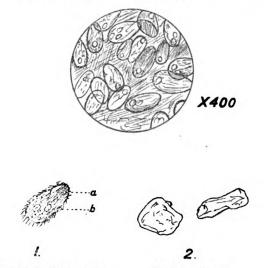
By A. B. Dalgetty, M.B., C.M. South Sylhet, India.

THE following peculiar case of rhinorrhœa may be of sufficient interest to publish.

The patient, who is a Hindu coolie, was shown to me one day as she was suffering from extreme anæmia. While examining her I noticed that she had a steady dripping of a clear fluid from one nostril, and on questioning her found that this had been going on for about three months. The liquid was dropping away at the rate of four drops a minute, and continued day and night; only when she lies on her back it drains backwards into the throat. It comes entirely from the right nostril. At first sight it looked like one of those rare cases of escape of cerebro-spinal fluid through the nose, but an examination of the fluid corrected that impression.

The following are its characters: Colour: opalescent, with trailing, hazy bands throughout, denser at bottom. Odour: peculiar, sickening, faintly like that of honey. Specific gravity: 1003. Reaction: alkaline, no sugar and no albumin. The alkalinity was due to the presence of sodium phosphate as shown by chemical analysis. Microscopic findings: a few cocci and diplococci were seen, but that which immediately arrested attention was the multitude of ciliated organisms darting and turning and doubling about in all directions. They are somewhat elongated, globular bodies, about 25  $\mu$  long and of half that breadth, provided with an elastic body-wall covered

with short cilia disposed over the whole surface and without any special adoral band or fringe. In certain positions a slight indent in the contour marks the position of the mouth. The body-contents are more



(a) Mouth, (b) vacuoles.

Dead specimens.

or less granular and at least one, or more often three or four, rounded clear vacuoles occupy the hinder end. These vacuoles frequently evacuate their contents and as rapidly fill up again.

The organisms are mostly of one uniform size, but numbers of smaller ones also exist, as shown in the ring-drawing. I tried to discover the method of reproduction but cannot say I succeeded: at times it seemed as if true conjugation were taking place. Drying up of the surrounding fluid puts an end to

their movements, which cannot be restored by applying fresh fluid and heat even after only a short interval. The organism would seem to belong to the Order Holotricha; Genus Paramæcium; but to what species is doubtful. It is smaller than the ciliata which one finds in the intestine of the cockroach, and it seems to differ also from the P. coli which is sometimes parasitic in the intestine of man and causes symptoms of dysentery (vide fig. 593 in "Hamilton's Pathology,"

vol. ii., pl. 2).

As to how the organism has gained a footing in the nose, there is nothing to show, nor does a rhinoscopic examination from the front discover from what part the discharge comes. So far I have not been able to get a good view of the nares by the posterior method. There is a little redness of the middle and inferior turbinated bones of the right side, but that is all I have noticed. The anæmia from which the patient is suffering need have no necessary connection with this other condition, which seems to be entirely a para-phenomenon.

#### CEREBRO-SPINAL MENINGITIS.

By E. G. Hamilton Williams, D.P.H., M.R.C.S., L.R.C.P. and Mary Hamilton Williams, M.B., B.S.Lond., D.P.H., Cantab.

Special Service Medical Officers, Ashanti Field Force.

(A previous communication on "Cerebro-spinal Meningitis," by the same authors, will be found in the Nov., 1900, issue of the Journal.)

AT the time of writing our last account it appeared that the epidemic was ending; but in this we were mistaken. Fresh cases continued to arise, and were noted nearly every day until the date we went off duty previous to our return to England, but the type of disease showed a steady lessening of severity. Many of the cases were undoubtedly of the mild type described by all authorities on this disease (Osler, Albutt, &c.), in which the complaint merely took the form of a few days' malaise, headache, giddiness, with slight fever. In each of the severe cases we had found the diplococcus in the peripheral blood during life; we found it also in the cases of only moderate severity, but yet presenting distinctive symptoms, such as retraction and rigidity of the head; and consequently we diagnosed the same disease in patients, seen at the same time, and in the same place, whose only symptoms, possibly, were giddiness and some headache with slight fever or malaise, yet who on examination of the finger blood presented diplococci and no malarial plasmodia. Two of these last mentioned cases suffered concurrently from another disease, one from liver abscess, and one from smallpox. These two cases were not under our care, and we do not know whether the presence of the one disease influenced the course of the other.

Altogether we found the diplococci in over 80 cases, and in some of these we found it when the symptoms were slight, but a few days later became unmistakably severe. On examining the blood the first point noticed in nearly all cases, was the marked polyneuclear leucocytosis; and when we found this in a high degree the further investigation of other fields

rarely failed to reveal the characteristic diplococci. It appears to the writers that this method of diagnosis, if confirmed by other observers, may lead to the recognition in the presence of an epidemic of many slight cases, which would otherwise be treated as "bilious attack," "febricula," &c., &c., and arguing from the analogy of diphtheria, these slight cases may yet give rise in another patient to a severe attack. In addition, many obscure sporadic cases of the disease may be recognised and the origin of outbreaks, which may have started from a very slight imported case, explained. In addition to finding the diplococcus in the blood, we found diplococci in the sweat in such numbers as to suggest that this is one method of elimination; but until the organism has been isolated in pure culture from this source one cannot be sure of its identity although its presence is sufficiently suggestive as to render extreme enforced personal cleanliness among the patients a most desirable prophylactic measure.

We believe that we detected the same organism in

the saliva, nasal secretion and the urine.

We obtained cultures on agar from the blood taken from the ear of a patient, the operation being conducted aseptically. From these first cultures films were made showing the diplococci with only slight impurities, but as we had no means of obtaining this culture in a pure condition, before reaching England, six weeks later, another organism had outgrown and killed the diplococci. The original growth on agar consisted of small, circular, scattered, whitish colonies growing at the body temperature (the tubes had to be worn during the journey, &c.) Microscopically the organisms were arranged as diplococci frequently occurring as double rows, thus // or in sarcinælike groups. They were not capsulated, did not retain the stain by Gram's method, and varied much in size. We found the diplococci in five cases in Europeans, four of whom were much exposed to infection. The following description of one of these five European cases is given as being fairly typical of a "slight" case. It began with sharp abdominal pain, nausea and purging; this passed off in a few hours, the patient meanwhile working as usual. General malaise, headache and slight rise of temperature then lead to a search being made for plasmodia, but diplococci were found instead. (This patient had previously had several attacks of fever, in each of which plasmodia had been found.) The next day there was great giddiness, headache, photophobia, shooting neuralgic pain in the back and limbs, insomnia and weakness, and a marked feeling of incoordination on trying to cross the room. There was also acute tenderness over certain of the upper dorsal and lumbar vertebræ. The temperature stayed between 99° and 101° F. There was no regular evening rise. In five days the patient returned to work, but continued to suffer from photophobia for about a fortnight, while insomnia and headache lasted for some weeks; and even as long as ten weeks after, reading or mental exertion produced undue fatigue and headache.

The questions which arise are:—If Weichselbaum's diplococcus is pathognomonic of the disease, is it

always in these cases to be found in the peripheral blood?

Secondly, is the very high mortality recorded in some epidemics of cerebro-spinal meningitis due to an increased virulence of the diplococcus, or is it due to a different organism?

Thirdly, is the presence of the organism in the sweat one of the chief factors in the dissemination of

the disease?

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# A CASE OF HEMIPLEGIA: OPERATION; RECOVERY.

By A. A. Bennett, M.B.Lond. St. Margaret's Hospital, Old Calabar, S. Nigeria.

Particulars of Case.

May 30.—Patient admitted with history of sudden loss of consciousness, followed on recovery by weak-

ness of right leg and arm.

On admission.—Marked rigidity whole of right side, knee-jerks both sides; no ankle clonus. Slightly diminished sensation right side; no facial paralysis. Patient can talk and understand what is said to him, but is dull and lethargic; passes water in bed.

June 1.—Patient had two fits in the evening, the convulsion being confined to the right arm and leg. When seen there was complete unconsciousness; total paralysis of arm and leg. Knee-jerk absent, pulse rapid, regular; breathing shallow and stertorous; pupils dilated. Passing urine and fæces in bed.

June 2.—On recovering from the coma, patient rapidly fell into same state as on admission; considerable spasticity returned. Still understands what is said to him, but has difficulty in answering any

questions.

June 4.—Condition unchanged; takes food well; motor aphasia present.

June 6.—No change.

June 8.—Slight convulsion yesterday, followed for a few hours by complete relaxation of leg and arm; leg slowly regaining spasticity.

June 12. - Rigidity again marked; aphasia com-

plete.

June 12-21.—During this time patient's condition became gradually worse. For a few hours some improvement would be noticed, patient taking a more intelligent interest in his surroundings, and making some attempt to move his right arm or leg. For the most part, however, he was dull and apathetic, not attempting to speak nor appearing to understand what was said to him. The rigidity of the right arm and leg increased, urine and faces were passed in bed with greater frequency, and though food was taken the amount was small, and the patient steadily wasted.

June 21.—Patient was trephined over left Rolandic area. Brain bulged into the wound and there was no pulsation; brain explored in all directions with needle and nothing found. Dura mater freely incised and an induction current passed through the exposed convolutions. Muscular contractions observed in leg and arm. Patient much collapsed after operation.

June 22.—Condition unaltered; patient puts out tongue when told to, but gives no other signs of

intelligence.

June 26.—Patient improved considerably since last note, can move himself independently and sit up in bed; evidently understands what is said to him; can move right leg and foot, and right arm to a less extent. Eats well; passes motions under him.

June 27.—Patient spoke distinctly this morning. On being asked what his name was, replied at once. Condition of right leg and arm unchanged. R.D.

present in both.

June 30.—Continues to improve; appears to take an interest in what is going on around him. Right arm and leg have been massaged daily and had continued current ten minutes. Since last note patient now moves right leg well, and arm slightly. Eats well; passes everything under him; very irritable when spoken to.

July 2.—Can move right fingers slightly, right leg well; is dull this morning. Still defecates in bed,

but uses urinal as a rule.

July 7.—Improvement continues; patient said "good morning" to-day. Asked for bed-pan; eating well.

July 10.—Patient crawled to ward table yesterday and had breakfast with other patients; very angry when the patients insisted on eating their own share of the meal. Less dull from day to day; wound healthy; no change in physical signs.

July 17.—Continues to improve; walks to table every day; yesterday went out on verandah. Still moves leg better than arm; intelligence much the

same.

July 20.—Patient passed motions under him several times the last two days, but evidently does so only

with intent to annoy the attendants.

July 25.—Patient discharged to-day practically well. During last two days he tried several times to run away from the hospital, and once nearly reached the top of Consulate Hill. At present he is almost as intelligent as he ever was, which is, perhaps, not saying very much; at least he understands what is said to him, and occasionally volunteers a remark himself. The right arm and leg are still weaker than the left, but apart from this do not differ in any respect. Finally, patient is eating very well, and has put on many pounds in weight since the operation.

# THE PREVALENCE OF MOSQUITOES AND MALARIA IN HONGKONG.

By J. C. THOMSON, M.D., M.A.

The following preliminary report, dated November 3, 1900, regarding a research into the prevalence of mosquitoes and malaria in the Colony of Hongkong and in the New Territory, is published by

the Government of Hongkong.

There are two distinct species of Anopheles abundant in the Colony, differing in size, general appearance, and the markings on the wings. The smaller, which I believe to be Anopheles costalis, is prevalent all over the Colony and in the ravines to the south of Magazine Gap; the larger, Anopheles sinensis, is the more common throughout the New Territory, on the Islands, and at Stanley and Pok-

fulam. While the area of general prevalence is thus different, it is not exclusively so, as I have myself caught *Anopheles sinensis* in the centre of the city, in a hotel not far from the Clock Tower, while *Anopheles costalis* has been included in some of the

consignments from the mainland.

I have differentiated at least eight distinct species of Culex, but I prefer not to commit myself to the naming of them until my classification has been confirmed or amended by an expert entomologist. To secure this I have sent to the London School of Tropical Medicine fifty-four mounted specimens, consisting of fourteen different species of mosquitoes, two species being Anopheles, eight species at least being Culex, and the remaining four species probably belonging to other genera of the mosquito family, though one or two of them may prove to be species All the above have unspotted wings, excepting the Anopheles and a single species of Culex, of which I have obtained only a single specimen. This I believe to be Culex mimeticus, and it is manifestly very rare. A good general rule, therefore, in Hongkong, in addition to the differences of the head appendages and the characteristic attitude when at rest that distinguish Anopheles from Culex, is, that a mosquito with spotted wings is probably one of the dangerous Anopheles, and one whose wings are unspotted is a Culex. I have privately submitted a few of the more prevalent types of both genera for His Excellency the Governor's inspection.

From my own observations, supplemented by those of Dr. T. M. Young, Civil Surgeon, R.A.M.C., with whom I have been working in co-operation since his arrival in the Colony in August, and who has given his attention more especially to the question of the breeding-grounds of the Anopheles mosquito in the Colony, I am of opinion that Anopheles breeds, or may breed, in the more stagnant shallows, and in the rocky corners and crevices, of any or all of the ravines in the Colony, and is practically confined to these during the greater part of the year. I wish it to be explicitly understood that my remarks on this subject apply to the city of Victoria itself, and not to flat grounds in outlying districts where all the conditions are different. The usual habitat of the larvæ of the Anopheles mosquito is the natural watercourses, and their favourite locations little breaks in the rocky surface by the side of the stream, where the merest trickle from the stream itself prevents entire stagnation, and where there is no through-

wash of water.\*

So far as the city of Victoria is concerned, therefore, the configuration of the ground greatly simplifies the question of dealing with the Anopheles pools. It reduces itself to the training of all the nullahs that are as yet untrained. The clearing away of undergrowth is an important adjunct to more radical measures, inasmuch as it removes cover where mosquitoes may rest, but it is to be regarded as entirely subsidiary to the destruction of the breeding pools; and this can only be effected by the conversion of the uneven ravines into well-paved nullahs. In the latter no Anopheles can breed,

since in the running water there is no resting place for the evolution of the egg and the development of the larva. This has fortunately already been done in the central part of the city.

The first untrained nullah as one proceeds westward is that to the west of the Nethersole Hospital, just above Ripon Terrace on Bonham Road. I have repeatedly satisfied myself by personal observation of the presence of *Anopheles* larvæ in this ravine, and the marked prevalence of malarial fever in houses in this neighbourhood is sufficiently accounted for

The extirpation of malaria in the western part of the city, which has in the past had such an evil repute as regards this disease, consists in the levelling or covering in of all the watercourses, beginning with the one I have named, and dealing with all between that and Kennedy Town. If this were done, malaria would largely disappear from the district, many sites hitherto avoided would probably ere long be made use of for the erection of European houses, and the fuller opening of this large area to building operations would be not unwelcome in the present

congested state of the city.

And here I would point out that the one watercourse in the west that has been to some extent
trained in the pre-mosquito-malaria-theory days has
been so trained that it is a perfect hotbed of malaria.
I refer to the nullah passing down in front of the
Public Mortuary. It has been trained in a series
of dams and terraces, which while excellent for
breaking the force of a mountain torrent on the rare
occasions when this is necessary, form during most of
the year a series of shallows in which the larva of
Anopheles abounds. It is urgently desirable that
these terraces should be levelled out, and a smooth
channel made for the stream, extending at least as
high as the Pokfulam Road.

I shall be glad to examine and report on other particular localities, if desired by His Excellency

to do so

Concurrently with my enquiry into the prevalence of Anopheles, I have been investigating the prevalence of the malaria parasite in the Colony. connection with Anopheles is now an accepted fact. The general mosquito-malaria theory has been proved to the hilt, and has recently been brilliantly demonstrated to the public by Manson's double experiment; but the connection of malaria with disturbance of soil, an important point in Hongkong, is by no means clear as yet. Grassi disposes of the subject by stating that it depends on the creation during digging operations of puddles of water in which Anopheles breeds. This certainly does not hold for Hongkong. The whole of the broken earth surface may show no single puddle, the sun drying the superficial layers as they are turned up; and yet it is a fact of experience that in certain parts of the Colony earth cutting is invariably attended by an outbreak of fever. On the other hand there is undoubtedly some connection with the presence of moisture in the soil—in certain localities, e.g., around MacDonell Road, where earth cutting may go on to an unlimited extent with impunity, I find that the soil is comparatively dry; while in others, e.g., the west point already referred to,

<sup>.</sup> Vide Addendum.

where the slightest excavation inevitably produces fever in the neighbourhood, I find that the soil is more or less water-logged. I propose to give attention to this question, which is one very seriously

affecting this Colony.

My chief field of observation as to the prevalence of the malaria parasite in the Colony has been the Tung Wah Hospital, where Dr. Chung has at my request been recently examining microscopically the blood of all cases of fever, and daily submitting specimens for my personal examination at my visit

of inspection.

There are three main types of malarial fever, associated with different and corresponding parasitic organisms, and all the three types of the parasite I have found prevalent in Hongkong:-the benign tertian parasite, easily yielding to the action of quinine; the quartan parasite, readily brought under control by the same drug, but difficult to eradicate; and the malignant parasite, variously described as æstivo-autumnal by Italian observers, tropical by Koch, pernicious, &c., less amenable to quinine, more severe in the resulting symptoms, and more apt to produce a fatal result or prolonged ill-health.

Of fifty cases in which, up to October 31, parasites were found, and their form and type recorded, three came form Kennedy Town, eighteen from the west part of the city, thirteen from the central parts of the city, six from the east part of the city, two from Happy Valley, and eight from outlying

The most common type of the parasite in the cases which I have examined has been the malignant parasite, with abundant crescentic forms; but I do not consider that this gives the true proportion of the prevalence of the different parasites in the Colony, since probably only the more serious cases of fever find their way into the hospital wards.

There has recently been a small epidemic of fever in the neighbourhood of the Naval Hospital and Morrison Hill Road. My first opportunity of personal observation in reference to it occurred on October 27, when I was requested to see the family of a European government officer whose four children had all suddenly become ill with high fever. I took a microscope to the house, and found the benign tertian parasite in the fresh blood of three out of the four cases. All readily yielded to quinine, and by November 1, they were back at school. I requested the father of the patients to catch for me some of the mosquitoes frequenting the house, and the first he submitted was a specimen of Anopheles costalis.

While pursuing this investigation into the prevalence of mosquitoes in the Colony and its dependencies chiefly with reference to the question of the presence of Anopheles, and the means to be adopted for its extermination, my attention has been directed most forcibly to the enormous prevalence of mosquitoes of the genus Culex. As has been mentioned, I have differentiated at least eight species of this genus. The Culex mosquito does not, so far as is yet ascertained, act as a host to the malaria parasite; but it as well as Anopheles is certainly the intermediate host of the minute parasitic blood-worm, the Filaria nocturna or Filaria san-

guinis hominis, whose adult form lies in the lymph vessels, and is the cause of the great group of elephantoid diseases. Elephantiasis is quite common among the Chinese in this region, though, for some reason not yet sufficiently explained, Europeans are as a rule exempt from it, an exemption, however, by no means complete; but most Europeans are affected by the immediate disagreeable effects of the bite of the mosquito, and few are aware that the daily supply of these vicious little insects is being

produced in their own houses.

I think public attention should be drawn to this fact. I would like to write it in large capitals, that I HAVE FOUND THE LARVÆ OF CULEX IN PROCESS OF DEVELOPMENT IN ABUNDANCE IN OR ABOUT EVERY HOUSE WITHOUT AN EXCEPTION IN WHICH I HAVE LOOKED FOR A few instances will illustrate the great variety, and also the common general character, of their breeding-places:—at the Alice Memorial Hospital I found them in an old teapot on the roof-balcony; at the Tung Wah Hospital, in the ornamental flower-stands; at the Gaol, in an empty pot in the coal store; at Kennedy Town Hospital, in the fire buckets; behind a house at the Peak, in a disused hand-basin; in another house at the Peak, in a dish placed to catch the water-drippings from the ice-chest, &c. In all these cases they were in abundance, and were daily giving off large numbers of full-grown mosquitoes for the supply of

their respective localities.

The crusade against the mosquito should include the Culex as well as the Anopheles. Anopheles must be dealt with by the Government chiefly, though owners of property may probably find it to their advantage to move privately in this matter as well; but Culex can be exterminated, or at least greatly diminished in numbers, by individual action alone. It may be impracticable to secure individual action of a sufficiently wide-spread character to make much impression on the sum-total of the Culex mosquitoes in South China, but every householder in Hongkong has it in his power by due attention to his verandahs, back-yard, and coolie quarters to secure that in his own house at least there shall be fewer mosquitoes in the future than there have been in the past. Many are aware that what they have often seen in such receptacles as I have described are the larvæ of mosquitoes; but few realise that these same wriggling creatures will a few days later rise from the surface of the water as adult insects, and will probably find their first meal of blood within the house that harboured them in the larval stage.

#### ADDENDUM.

Since the foregoing was written, a fact of very great practical importance has been brought to my notice by Mr. W. J. Tutcher. The Anopheles The Anopheles occasionally departs from its usual habits, and may breed in artificial collections of water. Tutcher I yesterday examined one of the Chinese flower-nurseries at West Point, that to the east of the house cal'ed "Nullah Side" from its location, and found in many flower-pots containing water the larvæ of Anopheles and Culex abounding side by side in the same vessels.

This observation does not affect the practical deductions I have already drawn regarding the usual breeding-grounds of the Anopheles; but, though I think it will be found that what I have above noted only occurs in the immediate vicinity of Anophelescontaining ravines, it greatly intensifies what I have said as to the desirability of every one doing his best to prevent vessels containing water from standing about yards or verandahs without being frequently completely emptied.

With reference to these Chinese gardens at West Point, I would recommend that the Sanitary Board should be requested to cause an officer to periodically inspect them, and treat as a nuisance any vessel

containing visible larvæ.

Before making this recommendation I have received the assurance of Mr. Tutcher, that the vessels containing the larvæ were not in a stagnant condition for any reason connected with the flowerproducing industry, and could equally well be kept fresh; and in a neighbouring garden which I visited this morning in pursuance of my enquiries I found as many vessels containing water, but hardly any containing larvæ. The owner of the garden told me that he frequently empties all dishes on account of what he called the water-mosquitoes. It would therefore be no hardship to insist on these nurserymen keeping their gardens in a condition better calculated to promote the public health.

J. C. T.

#### CASE OF BRONCHOCELE IN A NATIVE OF PERAK, MALAY STATES.

By P. G. Edgar, M.B., C.M.Edin., L.M.Dublin.

(Accompanied by Photographs. See plate.)

THE patient is aged 48, and was born in the Kwala Kangsai district of Perak, where the disease is endemic; it is largely prevalent in both sexes, but especially among the women. Kwala Kangsai is a mountainous district and geologically composed

chiefly of limestone.

The swelling commenced in the patient's twentieth year of life, when it was the size of a marble; it gradually enlarged until it reached its present dimensions. Both lobes of the thyroid are enlarged, and the nature of the enlargement appears to be cystic. Beyond the sensation of dragging about the throat the patient does not suffer from dyspnœa or dysphagia, whether sitting, standing, or lying on his side. Lying on his back, however, produces dyspnæa owing to compression of the trachea from the weight of the tumour. The Malays attribute the origin of the disease to the water, especially that obtained from the Kwala Kangsai river. patient's mother and sister also had bronchocele. There is no exophthalmos, and the pulse is 72 per minute.

#### Business Motices.

1.—The address of the Journal of Tropical Medicine is Messrs. Bale, Sons & Danielsson, Ltd., 83-89, Great Titchfield Street, London, W.
2.—All literary communications should be addressed to the

3.—All business communications and payments should be sent to P. Falcke, Secretary to the JOURNAL OF TROPICAL MEDI-CINE. Cheques to be crossed London and South Western Bank, Great Portland Street Branch, London, W. 4.—The Subscription, which is **Eighteen Shillings** per annum,

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7.—The JOURNAL will be issued on the first and fifteenth day of every month. Any delay in transmission should be immediately notified to the Secretary.

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THE

# Journal of Tropical Medicine

JANUARY 15, 1901.

#### IMPORTANT NOTICE.

BRITISH CONGRESS ON TUBERCULOSIS FOR THE PREVENTION OF CONSUMPTION.

President—H.R.H. The Prince of Wales, K.G.

#### EXECUTIVE OFFICERS.

Chairman of Organising Council—Sir William Broadbent, Bart., M.D., F.R.S.

Hon. Secretary, Museum Committee-W. Jobson Horne, M.B.

Hon. Secretary-General—Malcolm Morris.

President of Organising Council—The Right Hon. The Earl of Derby, K.G.

Hon. Treasurers—The Right Hon. Lord Avebury, Sir James Blyth, Bart.

Chairman of General Purposes Committee—Professor Clifford Allbutt, M.D., F.R.S.

Hon. Secretary of Reception Committee - Alfred Hillier, M.D.

20, Hanover Square, London, W. Objects of Congress.

His Royal Highness the Prince of Wales has graciously consented to open in person a British Congress on Tuberculosis in the Queen's Hall, London, at 3 o'clock in the afternoon of Monday, July 22, 1901; and it has been decided that the Congress shall be held from Monday, July 22, to Friday, July 26.

Every British Colony and Dependency is invited to participate by sending delegates; while the Governments of countries in Europe, Asia, and America are invited to send representative men of science, and others, who will be the distinguished guests of the

Congress.

The information already gained, both at home and abroad, shows that consumption and other forms of tuberculosis, although preventable and controllable by intelligent precautions, still remains the direct cause of a high rate of death and sickness. In the United Kingdom alone some 60,000 deaths are recorded annually from tuberculosis, and it is stated on good authority that at least thrice this number are constantly suffering from one form or another of the disease.

The knowledge of these facts, and the recognition that the disease is peculiarly amenable to open-air treatment, has aroused profound International interest in the question; and in many countries public authorities have been led to put in force preventive measures directed against the propagation of consumption between human beings, between animals, and between human beings and animals.

The object of the forthcoming Congress is to exchange the information and experience gained throughout the world as to methods available for stamping out this disease. Papers will be read, and clinical and pathological demonstrations will be given; while the museum, which is to be a special feature of the Congress, will contain pathological and bacteriological collections, charts, models, and other exhibits.

Authorities in this and other countries will be invited to supply documents bearing upon the historical, geographical, and statistical aspects of the subject; while as a result of the papers and discussions, practical resolutions will be formulated which will serve to indicate the public and private measures best adapted for the suppression of tuberculosis.

The work will be divided into four sections as

follows :-

SECTION I .- STATE AND MUNICIPAL.

President—Rt. Hon. Sir Herbert Maxwell, Bart., M.P., 49, Lennox Gardens, S.W.

Secretaries — Dr. Bulstrode, L.G.B., Whitehall, S.W.; Dr. James Niven, Town Hall, Manchester.

SECTION II.—MEDICAL, INCLUDING CLIMATOLOGY AND SANATORIA.

President-Sir R. Douglas Powell, Bart., M.D.,

62, Wimpole Street, W.

Secretaries—Sir Hugh Beevor, Bart., M.D., 17, Wimpole Street, W.; Dr. Hector Mackenzie, 59, Welbeck Street, W.; Dr. R. W. Philip, 45, Charlotte Street, Edinburgh; Dr. William Calwell, 1, College Square North, Belfast.

SECTION III.—PATHOLOGICAL, INCLUDING BACTERIOLOGY.

President—Prof. Sims Woodhead, M.D., 6, Scrope

Terrace, Cambridge.

Secretaries—Dr. Wethered, 83, Harley Street, W.; Prof. Rubert Boyce, Liverpool (Univ. Coll.); Dr. E. J. McWeeney, 84, St. Stephen's Green, Dublin; Dr. Perkins, 41, Wimpole Street, London, W.

SECTION IV.—VETERINARY (TUBERCULOSIS IN ANIMALS).

President—Sir George Brown, C.B., Bryn Hyfryd, Harrow.

Secretaries—Prof. Hobday, F.R.C.V.S., 27, Lower Phillimore Place, Kensington, W.; Prof. Bradley, M.R.C.V.S., Royal (Dick's) Veterinary College, Edinburgh; Prof. H. Woodruff, M.R.C.V.S., Royal Veterinary College, Camden Town, N.W.

EXHIBITION—THE MUSEUM OF PATHOLOGY, BACTERIOLOGY, AND PUBLIC HEALTH.

Chairman of Museum Committee—Prof. Sims Woodhead, M.D., F.R.S.E., 6, Scrope Terrace, Cambridge.

Secretary—W. Jobson Horne, M.B., M.R.C.P., 27, New Cavendish Street, Harley Street, W., to whom all correspondence relative to the Museum should be addressed.

#### RULES AND REGULATIONS.

(1) The Congress shall consist of Honorary Mem-

bers, Delegates, and Members.

Honorary Members shall be persons nominated by any foreign Government or University, or by the Executive Committee, and shall not pay any subscription whatsoever.

Delegated and Ordinary Members shall be other persons, British, Colonial, or Foreign, who may wish to attend, including representatives from Governments

or institutions within the British Empire.

(2) Delegated and Ordinary Members will receive their cards on forwarding the sum of £1 to the Secretary-General of the Congress, 20, Hanover Square, W.

(3) The holder of a ticket of membership is entitled to admission to all the meetings of the Congress, and to receive the *Transactions* and other publications.

Tickets to social gatherings and excursions will be allotted in order of application, or by ballot if

necessary.

(4) As the expenses of the Congress will be very considerable, Donations to the Reception Fund are earnestly invited. Donations of more than one guinea will be considered as including Member's subscription, and will entitle the donor to all privileges of Membership. Donations from Corporate Bodies may include the subscriptions of representatives.

(5) The official language of the Congress shall be English, French, and German, and authors of papers are requested to supply beforehand abstracts for

translation.

(6) Each Sectional Committee shall draw up its own working programme as to papers to be read, discussions on the subjects proposed, and miscellaneous communications. The various Sections will

meet on Tuesday, Wednesday, Thursday, and Friday, from 9.30 to 1.30.

- (7) The speeches delivered at the general assemblies, and the papers read before the Sections, will be published in the record of the proceedings of the Congress; but as regards miscellaneous communications and discussions the discretion in respect of publication will lie entirely in the hands of the *Transactions* Committee and the Presidents of Sections. Each speaker opening a discussion will be limited to thirty minutes' duration, and each subsequent speaker to ten minutes.
- (8) An abstract of every paper and communication must be sent to the Secretary-General, 26, Hanover Square, at the latest on or before June 15, 1901.

## Cranslations.

#### SOME REMARKS CONCERNING BLACK-WATER FEVER.\*

By Dr. HANS ZIEMANN.

Captain in the German Naval Corps, Physician to the Government of Camaroon.

(Translation by L. EYK.)

GENTLEMEN,—It was not originally my intention to speak on this theme at the present time, only having returned from Africa a few days since, I have not yet had time to consider the question in extenso. However, seeing that opinions on this malady are very different, I will give a short account of my own experience, which is especially opposed to that of Drs. Clarais and Robert Koch.

I will first mention that I have never found a specific microbe for this malady as Yersin asserts he has. The clinical picture should be sufficiently known already from excellent descriptions given by many observers. The fact that the malady has been described by some to be purely a quinine poisoning, by others a special form of malaria occurring in certain districts where the affection appears with greater virulence, renders the subject less easily grasped.

If I combine my experience which has been gained from one of the worst blackwater fever centres on the earth with that which can be obtained from literature, I come to the following conclusions:—

(1) In certain virulent malarial centres there exists, among a certain proportion of individuals who have gone through one or more attacks of malaria, a disposition to contract blackwater fever; this tendency exists among the strongest and healthiest individuals. This disposition to blackwater fever is more likely to exist in persons of a family in which a hæmorrhagic diathesis prevails, aggravated no doubt in those who undergo sorrow, deprivations, and great physical exertions.

(2) This disposition seems mostly to exist in persons who have suffered from an infection with the small parasites of the tropics, or of estivo-autumnalis. Koch also observed blackwater fever in persons who had simple tertian; Plehn twice, myself once; Grocco

also noticed it in persons who had quartan fever. In two of R. Koch's cases, however, it is certain that infection through the small parasites also existed, as crescents were found in the blood. Whether in the other cases of Koch's infection through small parasites had previously taken place or not, we will leave undecided. In my cases of simple tertian which were complicated with blackwater fever I should like to emphasize this possibility. Of course I do not mean to say by this that common tertian or quartan under some circumstances do not predispose to blackwater fever.

(3) With regard to the statement that blackwater fever only occurs in a virulent form in certain regions, I should like to call attention to the fact that possibly quite a different virulence of parasites exists, according to the local conditions to which it owes its origin, without necessarily being of a different class. Besides this it must be remembered that in such a dangerous blackwater fever centre as Camaroon, only a few sexual forms, such as crescent, &c., are found. These forms, which occur in Italy very frequently, are mostly only found in cases which are readily curable. As I explained in my other lecture at the Pasteur institution, also in Camaroon the number of parasites in the peripheral circulation is strikingly disproportionate to the importance of the clinical symptoms. In Italy, where blackwater fever is very rare, but where infection through the parasites which are so closely related to those of the tropics is very frequent, I found during my malarial expedition that such a disproportion was much rarer. I should like to strongly advise attention to be given to these important facts in all countries where blackwater fever exists.

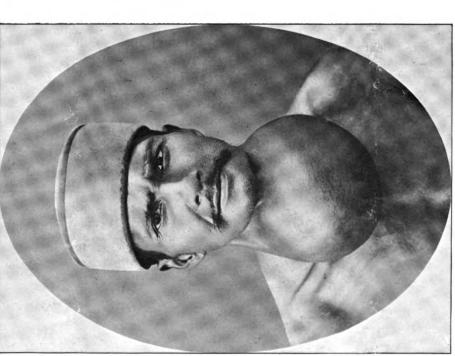
On the basis of the tendency discussed above true blackwater fever can only break out through:—
(a) A fresh attack of malaria alone, though quinine has not previously been administered. These cases, as far as they are positively known, appear to be more rare. The breaking out of blackwater fever is favored if at the time the body of the patient has been weakened by cold, &c.

(b) Through a fresh attack of malaria and the administration of quinine at the same time. Such cases greatly preponderate in Camaroon. It appears, as the Brothers Plehn have already found, that in such cases blackwater fever is most likely to break out when quinine is administered, when the fever is at its height. But such cases in my opinion cannot be looked at as simple quinine poisoning, as here two factors, quinine and the malaria, may work together on the patient, who has a tendency to blackwater fever, to produce true blackwater fever.

(c) Through quinine alone, in those who have recovered from malaria, but in whom at the time no parasites are found in the peripheral circulation. These are the cases which Tommaselli has described as quinine intoxication.

(d) Without quinine, in those predisposed to it, who have formerly recovered from malaria, and who have previously recovered from blackwater fever. Such persons can again get this malady though quinine has not previously been given, and though malarial parasites are not to be found in the blood.

A Lecture given at the International Medical Congress in Paris in the section for Colonial Medicine, August 7, 1900.



JOURNAL OF TROPICAL MEDICINE, JANUARY 15, 1901.

FRONT VIEW.

SIDE VIEW.

# BRONCHECELE IN A MALAY.

From a photograph sent by Dr. P. G. EDGAR, of Perak. For description see text.



You therefore see I no longer make a difference between the so-called quinine hæmoglobinuria and "febris malarica hæmoglobinurica," as firstly important clinical differences do not exist, and these titles do not appear to me to describe the true character of the malady. I therefore simply speak of febris hæmoglobinurica, and in the above scheme we can place every case of this so frequently The true reason of this mysfatal malady. terious decomposition of the blood we do not yet Perhaps we shall acquire more knowledge when we know more of the condition of the parasite forms, which give origin to the malarial relapses (see my other lecture on malaria and mosquitoes on the west shore of Africa.) Blackwater fever also attacks the negroes—Tagos, who have never taken a particle of quinine. On the Congo similar facts have been observed. I saw all transitions from the slightest to the most severe forms. In the slight forms only a beer-brown colouring of the urine, which contained traces of albumen, resulted. A rising of the temperature and a disturbance of the general condition did not take place. It is these very slight forms which, theoretically, are just as interesting as the severest forms are unfortunately often overlooked. In the severe cases in which the hæmoglobin which dissolved in serum could be proved, the per cent. in the blood sank, in one case, in two days even 50 per cent. That the recovery from blackwater fever does not always mean the disappearance of the malaria which existed at the same time, a study of the tem-perature charts will prove. They also show the important fact that by extremely careful proceedings we are able, in spite of extreme idiosyncrasy to quinine, to accustom the organisms gradually to quinine, and in that way to bring the malaria to an end.

In a well studied case, it was proved that when 0.75 gram quinine produced hæmoglobinuria, 0.06 gram quinine produced albuminuria. In predisposed malarial cases, 0.1 to 0.25 gram quinine produces hæmoglobinuria on the west coast of Africa not infrequently.

The absurdity of a promiscuous quinine therapy for such a blackwater fever centre as the coast of New Guinea is self-evident. The Brothers Plehn have already given us light on the subject.

In my opinion the prophylaxis against the blackwater fever will be attained by prophylaxis against malaria.

# MALARIA AND MOSQUITOES ON THE WEST COAST OF AFRICA.

By Dr. HANS ZIEMANN,

Staff Surgeon, late Government Physician in Camaroon.

(Translated from the German by P. FALCKE.)

#### REPORT II.

(Concluded from p. 12.)

THERAPEUTICS AND PROPHYLAXIS.

Quinine is, and primarily remains, the sovereign remedy. Phenocoll and methylene blue, the latter of which has been tried as a substitute for quinine,

have, time after time, proved inefficacious. As to the manner of administering quinine during the attack, it may with advantage be stated that it should not be given at the height of the fever, but if possible during the intermissions, about five or six hours before an attack is expected. The largest quantity in a day should not exceed 2 grains of quinine.

When the stomach rejects quinine, as when severe vomiting is present, intramuscular injections of the drug have been recommended and used by A. Plehn and myself for years. A note of warning is sounded against the random administration of quinine in scattered, numerous, and small doses pro die, without reference to the microscopical condition of the blood. Equally would I warn against the unpractical following of the rule which I have often found on the West Coast of Africa, that quinine is only to be taken when the temperature is 38° C. When it is the question of a first attack of fever the temperature seldom falls to 38° C. at the intermission. From fear of blackwater fever, such patients go for weeks without quinine. The loss of strength goes on and thus certainly a predisposition to blackwater fever is furnished, and even putting that on one side these protracted cases are much more difficult to cure. In cases in which parasites were to be seen in the most varied stages of development, I have even administered quinine when the temperature was up to 40° C. if intermissions did not set in soon. Of course, in the case of persons who have been in the tropics a longer time, one has to be more careful of the size of the dose, for then the danger of blackwater fever increases. I have the firmest conviction that quinine influences the asexual parasites in all the stages of their development, only in different degrees, affecting most the youngest extraglobular forms. I still retain my former opinion that quinine only directly touches the protoplasm of the parasite, and secondarily affects the chromatin. Enquinine is preferable to quinine for persons sensitive to quinine. Methylene blue as a prophylactic, as recommended by Celli, is from various causes tabooed on the West Coast of Africa. A medicinal prophylactic against malaria in the tropics must, above all, have the property that it be lasting, that it be taken without reluctance, without injuring the appetite, and last, but not least, that it may be used generally and with effect. Thus for the present we have but quinine and enquinine. Six years ago I used quinine in 1 gram. doses prophylactically, with the best possible results, though it was a very bad year for fever (Centralblatt für Bakteriologie, 1896, vol. xx., p. 671). Only 23:49 per cent. of the people under my care had first attacks, and only 8.14 per cent. had relapses. Formerly the statistics often showed double or four times these figures. Relapses in particular were very much more frequent; for on the West Coast people fought shy of quinine.

The above proceeding, however, was easier on board ship, where the danger of blackwater fever was practically much less. In such notorious fever regions as Camaroon, where hæmoglobinuria is so frequent, the prophylactic dose of quinine must be smaller. In other words, the quinine prophylaxis is not one to be used at random, it must be individualised according to the fever-region, but where possible it should be in

general use, and should be systematically carried through, as was done by A. Plehn in the case of officials who had to take 0.5 gram of quinine every five days. At any rate, the prophylaxis which is to prevent relapses, should, from disciplinarian grounds, be the same, which should prevent fresh infection. I found it advisable to order 0.5 gram quinine to be taken every fourth morning fasting, in some tea, so that there were three clear days without quinine. Persons who are already used to the five days' prophylactic should keep to the same. Supposing, however, malaria had been present and quinine had been given on the last day of fever, a few germs might be left which, after twice twenty-four hours, would cause a recurrence. Should quinine then be given after four times twenty-four hours subsequent to the fever, one would just hit upon the easily influenced adolescent forms of the parasite.

This prophylaxis is not a guaranteed protection against malaria, but it ensures a lighter course to the malaria which eventually sets in, and provides a less predisposition to blackwater fever. Personally I remained free from manifest infection notwithstanding the frequency of the possibility of infection. If, in spite of the 0.5 gram quinine (taken on the quinine day) symptoms of latent malaria set in on the following day, I had the doses of quinine repeated on this day and eventually gave 1 gram more. It is of the greatest importance to suppress tropical malaria, once it has broken out, as quickly and energetically as possible. When the parasites have disappeared out of the peripheral blood, I administer 1 gram quinine on three consecutive days, and during the next three weeks 0.5 gram every other day. At the end of that time the patient can return to the ordinary quinine prophylaxis, 0.5 gram every four days.

I can warmly recommend this kind of prophylaxis after recovery from a recent infection. A simple consideration shows that, when the relapses disappear the sexual forms, such as crescents, &c., which are the forms found in relapses, and which by means of mosquitoes convey new infections, also vanish. Five years ago I called attention to the necessity of giving quinine prophylactically when crescents, &c., represented the only conditions of the blood (Centralblatt für Bakteriologie, vol. xx., p. 670).

Naturally a general treatment must go hand in hand with such medicinal and individual prophylaxis to guard against fresh infection or relapses. The hygiene of dwellings, of clothing and of food in the tropics must be practised in quite a different degree to what has hitherto been done by private people.

In this respect, from ignorance or indolence, much is left to be desired on the West Coast. To add to this, the number of available mosquito nets is very small. By means of common-sense teaching as to the nature of malaria, the effort must be made to minimise the influence of so-called "old Africans" who, with the best intention, hold forth on their inimical opinion of quinine, and in whom new arrivals blindly believe on account of their African experience. Only a small part of these people believe in malarial parasites. Above all, and for every calling, only the strongest people should be sent out, and twenty-five years should be the minimum age. On all these questions I shall make further

communications. Already the Plehn Brothers, from the wealth of their experience, have protested against the long stay of Europeans on the West Coast. It is a fact that every year many dozens of valuable human lives might be saved by the abolition of the evils mentioned.

In the meantime, in order to provide a prophylaxis as a whole, which would include the great civilised nations of the fever-pregnant parts of Africa, it is absolutely necessary to arrive at a knowledge of the life of malarial parasites outside the human organism. By reason of biological discussions, Mannaberg, with myself, had come to the conclusion that the malarial parasites had a parasitical existence outside man, which must be located in another organism. As relatively few mosquitoes are found in Camaroon, the idea that mosquitoes might be the means would hardly suggest itself. When Ronald Ross's discovery placed the mosquito theory on a solid basis, the necessity of confirmation of the same arose as to:-

(1) Which insects transfer the infection to man?(2) Whether the infected mosquito transmits the infection to its descendants, which on their part again infect human beings, or whether the infected mosquito infects man direct?

(3) What are the biological conditions of mosquito

(4) Whether, besides man, other hosts for malarial parasites exist?

Remarks on Question No. 1.—It is to be remarked that besides mosquitoes 82 bugs (Cimex lectularisus) and over 100 sandflies were examined in the dwellings of malarial patients for malarial cocci-all with negative results.

In Camaroon and Cribi I confirmed, first one, subsequently two different anopheles; on the upper part. of the Camaroon river I also found one new species, and in Victoria three, of which two were identical with those of Camaroon. Anopheles were confirmed by me in Victoria at a height of 260 metres, and a culex at the height of 1,600 metres. In Togo four different anopheles were found, one of which had

unspotted wings.
In Report I. (see December, 1900, issue of this Journal) I mentioned that in the Colony of Camaroon, after great difficulties I succeeded in confirming the transformation of the sexual forms of the tertian and tropical parasites to coccus-like formations in the intestinal tract of the anopheles.

In Togo I had the good fortune to again be able to demonstrate the cycle of development of the tropical Thus for our German parasite in the anopheles. colonies the investigations which Ronald Ross and Koch made on the malaria of birds, and Grassi, Bignami and Bastianelli on the malaria of man are confirmed and thereby the basis for a prophylaxis of greater scope is afforded. My efforts to propagate quartan parasites in anopheles in Togo have hitherto proved unavailable, for the sexual forms could never be confirmed in the blood of the infected negroes.1

The development of the malarial parasites in the

<sup>1</sup> It was only in Togo that, from a short notice, I gained the knowledge of Ronald Ross' investigations on human malaria in Sierra Leone.

mosquito seemed to take somewhat longer in Camaroon and Togo than stated by Grassi, Bignami and Bastianelli, namely from ten to sixteen days. It is true the corresponding experiments were not made in an incubator at 30° C., but in a darkened room at a temperature of from 25-28° C. It has already been mentioned that the malarial blood at my disposal was very poor in crescents, the number of infected anopheles remarkably small.

In Togo there was a black culex with white tufts on breast and legs and which possibly might be an intermediate host of the malaria germs. The examinations of these could not be concluded. This black culex, with two similar culices, is extant along the entire coast from Togo to the South of Camaroon. The same is very blood thirsty, and like all anopheles on the West Coast bites at all times of the night and day, though it prefers the night. This statement is of importance as showing that the infection does not only take place at night, when it is possible to protect oneself by means of mosquito nets against the onslaughts of mosquitoes. The mosquito fauna, in places quite near to each other, is often quite different. Thus there were amongst mosquitoes from Lome in Togo, some such as did not exist in Small-Popo, only 50 kilometres The question whether anopheles only, or in some places a culex likewise causes the malarial infection, is only of secondary importance for the measures taken for the destruction of culices and anopheles would be about the same. Only as we shall see, the anopheles would be easier to exterminate. Incidentally, also, I discovered anopheles on board steamers 1,000 metres distant from the coast.

Remarks on No. 2.—In reply to this question I refer the reader to Report I. (in December, 1900, issue

of this Journal).

Remarks on No 3 .- The biology of mosquito life is covered by the work of Grassi and Celli in Italy, and the question opens up for many localities the prospects of a more vigorous method of destroying these insects. The measures, however, must be vigorous and thorough, for the larvæ of culices preserved in moist soil have been proved to be alive after two days. The culex chooses for the deposit of its ova small puddles of water, very often water barrels, in short, any collection of water. Anopheles generally picks out small, clear, quiet, shady pools containing green algæ. In Camaroon, as also in Togo and Victoria, they were found occasionally in the muddy water of half dried up bogs. I never found the larvæ of anopheles—easily distinguishable from those of the culex on account of their horizontal position in the water—further away from human habitations than 1,000-1,500 metres. Possibly they may be further away where there are pasturages. Lizards were often found in common with them. In Camaroon, at the commencement of the rainy season, anopheles were found more often in way-side puddles or in cans half filled with water, but never in rain-water tubs, and never in the flowing water of a little rivulet which divides the two capitals, Belltown and Aquatown, but again, they were found in stagnant pools by the edge of the rivulet, and above all in the small puddles of the Negro town. Very often in Victoria, anopheles, after the setting in of the rainy season, were found in small ditches by the path

that runs through the so-called Victoria Marsh, as also in small bogs in the valleys, where the ground water appears on the surface; in Togo also in deep wells and furthermore in small pools at the end of the lagoon. Close by the Nightingale Hospital in Small-Popo, they were found in large numbers inside open cemented basins, in the waters of which ducks and geese disported themselves. They therefore seem to be able to adapt themselves to various conditions of life. In Victoria, the larvæ of anopheles died off when I conducted air, by means of a ventilator, into their receptacle for twelve hours. Never were larvæ found either of culex or anopheles in larger sheets of wind-wafted water, as for instance, the Camaroon River or the actual Togo Lagoon. As to the influence of saltness of water on the development of larvæ see Report I. The introduction of sea water into pools close to the coast might therefore eventually, according to circumstances, be used as a method of destruction. All mosquitoes prefer dark walls to light painted ones as hiding places. The few data here brought forward show us the way to effectually exterminate our enemy. The walls of dwellings should be painted

light and should contain no dark corners.

All stagnant agglomerations of water near dwellings, as has been found out by the Italians, must be avoided. Water-butts should be provided with closely fitting covers, ground water should be drained away; likewise stagnant surface water by means of open drains, the base of which should be cemented. A descent of the same can mostly be managed. Should the draining away of stagnant water prove too difficult, the pools every ten days must have petroleum poured into them with a watering pot. The layer or film of petroleum need only be a thin one on the surface; I found, as the excellent investigations of the Italians had already proved, that the petroleum furnished a very good and practical means of killing the ova and larvæ. Petroleum is always obtainable in the tropics. For the development from ovum to mosquito, from twenty-two to twenty-four days are necessary. In West Africa the pupa stage only lasts from one to one and a half days. As I experimentally convinced myself, not one single mosquito developed when the above process was followed. Of course, the pouring of the petroleum into the pool must be done on dry days, so that it is not too much diluted by rain to work effectively on the larvæ. I found on experiment that the pupæ were more capable of resistance than the larvæ. How easy destruction often is I could instance by many telling examples. For instance, in the cocoa and tobacco plantation of Bibundi, near Victoria, one hour's labour of a negro sufficed to convert a water basin (containing anopheles-larvæ) fed from a spring into a rapid mountain rivulet. In nearly all the plantations there I have already this spring found ways and means which would partly or completely free them from anopheles. The intelligent mind of the planter gives hopes that the reforms may be carried out, when possible, under the direction of the doctor. A more general knowledge of the different culices and anopheles, as also of their larvæ, is therefore very desirable. The percentage of morbidity and mortality would soon be favourably influenced. Certainly, it

cannot be denied that the difficulty of drainage for the purpose of exterminating the mosquitoes may be very great. For instance, on the upper part of the Camaroon River, at the mouth of the Dibombe, there are a number of negro settlements, and a few factories belonging to whites. In the immediate vicinity of the same there is an enormous morass covered with thick bushes, in the innumerable puddles of which millions of mosquitoes, amongst which are anopheles, abound. When, towards the end of the rainy season, I stayed there for the purpose of study, the mosquitoes constituted a terrible plague. It would simply be impossible to drain such a morass. In such cases one can but try to raise the general standard of health by means of methodical quinine prophylaxis and the other hygienic factors quoted. In the tropics, indeed, when building on new localities, it should be the tropical hygienic doctor and not the architect who should be consulted. Above all, the settlements of the negroes should be at least 1,200 metres distant from the dwellings of the whites, for, in the first instance, they supply the conditions for the spread of malaria.

I have the strongest feeling against the use of incense, inunction with ætherised oils, &c., in order to keep the mosquitoes at a distance. In theory these methods are very nice. In West Africa they will never be accepted. The anointing of the skin with oils would be impracticable, for the simple reason that in the damp-warm climate the European skin becomes

exceedingly sensitive.

A second mode of general sanitation of the tropics theoretically, would be to submit the entire population, black and white, to a universal strict quinine prophylaxis. Theoretically, by these means, the formation of the sexual parasitical forms could no more take place. The malarial germs could not vegetate further in the mosquitoes, in short, malaria would die out. Such a proceeding would be considered justifiable in settled, more highly civilised natives of fever regions, but could never be compassed as regards the more or less floating population of West Africa. Thus, the superstitious mind of our negroes, who have more faith in the faculty and unearthly yellings of their wise men and women than in the medicines of the most learned white doctors, would never submit to any prophylaxis of their own free will. The Dualla are pedlars and wander through the land, men as also boys, in hundreds. Even if their malarial infection in Camaroon could be cured by quinine, the possibility of new infections exist nearly everywhere. In the African primæval forests there is neither doctor nor magistrate who could distribute quinine. Were the little children the only carriers of the infection the practical difficulties would be less. However, as we have seen, such is not the case. Even the mountain folk, the Bakweris by Victoria, are more or less migratory. It would be easier to carry out the prophylaxis of the natives in Togo on the Ewe-negroes. But even with these, who are employed in hundreds along the whole malariadrenched coast of West Africa as workmen or labourers and are continually exposed to new infection, there is a constant coming and going. The Haussas, too, who come from the unknown interior, also constantly

carry in new malarial germs. What, however, is a crying need, and would, besides, be practicable, is that all white Officials of the State should by contract be forced from the commencement to take quinine prophylactically, and each man should take quinine in Europe before starting, to prove that there is no idiosyncrasy against it. He who cannot stand it should stay in Europe. Hardly any one now journeys to West Africa on pleasure, and the man who goes there on business in a sense no longer belongs to himself but to his employer. The State, like the private employer, may therefore also demand that its officials should maintain their health by following the necessary orders. Fortunately the number of white persons willing to undergo the prophylactic treatment is increasing on the West Coast. It would also be practicable for white householders to introduce and systematically administer quinine to their black indoor servants and to their work-people. In this connection I more particularly refer to the labourers on plantations. These, unfortunately, are generally lodged near the dwellings of the whites. Thorough and systematic administration of quinine to the actual natives would, I fear, be a matter of difficulty. Therefore, as already mentioned, they should not, as in Camaroon, dwell in the immediate vicinity of the whites.

An enemy should be beaten not at one but at every point. Thus, the malarial germs can only be combated by the combined measures here briefly sketched, and with a strict regard to the local, often varying, condi-

tions. There can be no general scheme.

Remarks on No. 4.-In regard to a few investigations as to whether, besides man, animals may eventually prove the intermediate hosts of malarial parasites, see Report I. The investigations were also interesting from the purely parasitological point of view. As in the case of proteosoma, halteridium, in a great number of birds examined, were less numerous than in Italy and the East Indies. Drepanidia, likewise, were more rare with us in frogs and lizards, but on the other hand, more numerous in snakes. My former doubts of the statements that the drepanidia were quite distinct from the cycle of development of the parasites of the blood corpuscles have received fresh confirmation. Incidentally while making blood examinations from animals in Togo, in June, 1899, I discovered a disease in a dog, which was similar, if not identical, with tsetse, being caused by trypanosoma; it had a rapid, fatally terminating course, and was transferable to goats. I likewise discovered a horse disease, which seems identical with the dourine of horses described by Nocard in Algiers. Oxen and goats never exhibited parasites of the blood corpuscles. The infection of a dog and long-tailed monkey with parasites resembling the tropical parasite has been described elsewhere (Report I.). I was the first to confirm this infection in the monkeys. I was prevented from undertaking immunising experiments against tropical fever with the serum of bats and monkeys, which exhibited tropical like parasites on account of the scarcity of animal material. I could not accomplish an infection with tropical parasites on two long-tailed monkeys and two bats. At last I succeeded in again discovering the pigmented parasite in a chimpanzee from the French Congo, which Koch

first discovered in the East African ape. In this case also no segmentary forms could be found. Possibly, therefore, man may be regarded as the sole intermediate host of malarial parasites.

In this article I think I have covered the principal tropical-hygienic points of view which come into the question for the beautiful German colonies, Camaroon

I trust they may soon have good and favourable

It will be of value even if the discovery should be made that the bite of the infected mosquito does not represent the only method of infection.

In conclusion, I must tender my thanks to Governor v. Puttkamer and Governer Köhler, for their important

assistance and support in my work.

## British Medical Association.

ABSCESS OF THE LEFT LOBE OF THE LIVER, PARTICULAR WITH REFERENCE TO ITS AMŒBIC CAUSATION.

By Staff-Surgeon P. W. BASSETT-SMITH, R.N. Lecturer on Tropical Diseases, and Bacteriologist, Haslar Hospital.

(Continued from p. 16.)

ALL cases of abscess of the liver are of great interest, owing to the diversity of opinions held with regard to their causation, the difficulties of diagnosis often present, and the

great variety of symptoms during the course.

Of late years the theory that many of these abscesses are directly due to the presence and products of the amæba coli so ably advocated by Kartulis and Lafleur, has been gaining ground. Any cases, therefore, which have a direct bearing on this are of importance. I have accordingly ventured to bring before the Association a case which has lately been under my treatment, and which seems to me to point strongly to the validity of this theory. The case is the more interesting as occurring in England, in a man who had not been abroad for two years, and also that systematic and scientific observations were carried out in the new and wellequipped laboratory attached to the Royal Naval Hospital, Haslar. In this case the hepatic abscess followed quickly after an attack of dysentery; amobæ were abundantly found in the abscess fluid to the complete exclusion of pyogenic bacteria. After death recent shallow (probably amœbic) ulcers were found in the cæcum.

Three chief views are held as to the pathogenic action of

the amœba coli.

(1) That of Kartulis, who believes that they play a principal part, by their active movements causing rupture of the capillaries, &c., but that they also act as carriers of bacteria which cause the suppuration of the liver.

(2) That of Kruse and Pasquale, who think that none of the bacteria are sufficiently constantly found to be considered specific, but that with some of these pyogenic organisms the amœbæ assist in the disintegration of the liver substance.

(3) That of Councilman and Lafleur, who consider the amœba coli alone as active agents in the production of these abscesses, which view is strongly favoured by the character of the local lesions and the frequent absence of any pyogenic

organisms, even when carefully looked for.

The subject of the present case was a petty officer in Her Majesty's Navy, of robust constitution and healthy habits. He had not been further than the Mediterranean for a long time, having been back over two years. He had not out there suffered from malaria or dysentery. In November, 1899, when at his own home in Portsmouth, he had an attack of semi-acute dysentery, lasting a month. December he was feverish and was said to have influenza; having some lung symptoms he was in January sent into Haslar Hospital. After admission he had high fever with marked rigors; a diagnosis of malaria was made. February he was transferred to the ward for tropical diseases. There I utterly failed to find any evidence of malarial infection, but a leucocytosis with an increase of fibrin threads in the blood was very marked. From this I gathered that there was an acute inflammatory condition going on. Serum diagnosis observations for Malta fever and typhoid gave negative results. No tubercle were present in

the scanty sputum.

With the history of recent dysentery the probability of hepatic abscess was evident; but though constitutional symptoms were very marked, rigors, irregular fever, profuse sweats, and increasing anæmia, yet there were absolutely no liver symptoms, this organ appearing smaller than normal. A consultation was held, operative measures being deferred. The condition did not improve, a short irritating cough came on, the sputa being scanty and mucoid. Finding some impaired resonance at the left base I explored there with The next day he was placed under an negative results. anæsthetic, and though no signs of hepatic enlargement were present, the right lobe was carefully explored with a large needle, three punctures being made from the side and three from the back. No pus was, however, found. The signs of septic poisoning continued, the rigors being less marked, but the cough more troublesome, the sputa still remaining scanty, mucoid, and free from tubercle. Diaphragmatic pleurisy was undoubtedly present; later a localised pain was felt in the right hypochondrium. I again explored without result. Signs now of cardiac disease became apparent, fleeting bruits, diffused and displaced

impulse, with fast and soft pulse.

A bacteriological examination of the blood from the finger tip was made, but in spite of great care an impure culture of staphylococcus epidermidis albus, and sarcina rubra was only obtained. The rigors were now very intense, the temperature rising to 106°-108°. He, however, continued to eat well in the apyrexial periods. Antistreptococcus injections were given, but they did not reduce the fever. Muttering delirium came on at night, and he appeared losing power rapidly. On April 13 I noticed his legs drawn up, and found some fulness in the left hypochondriac region. It was immediately explored, a little reddish pus being drawn off from which an agar tube was inoculated. next morning he was anæsthetised, the part opened by Fleet Surgeon Gimlette, R.N., through the adhesions, a quantity of red curdy fluid escaping. His temperature fell considerably after the operation, but he only lived three days. On the day of his death amœbæ were abundantly found in the discharge, but no pyogenic organisms were obtained, either from the first pus drawn off, or from that at the time of the operation, though cultures were made in broth, on agar, and on blood serum. The post-mortem examination showed firm adhesions of the liver at the seat of the incision, but none elsewhere. The liver was enlarged, weighing 70 ozs., the left half was deeply congested, the left lobe was very slightly enlarged, though entirely excavated by the abscess, the walls being in a shreddy, grey, necrotic condition. There was no secondary abscess of the liver. The left lung was healthy, the right was attached by adhesions to the diaphragm but could be easily peeled off, showing no loss of continuity there; the lower lobe was firm, having in the centre a large ragged grey, abscess cavity, very like that in the liver. There was marked recent pericarditis, the surface being coated with rough lymph. The valves and endocardium were healthy. The whole of the cæcum showed evidence of recent ulceration; these ulcers were oval with thickened edges, having for their floor the submucosa. The surrounding mucous membrane was congested, but there was no marked thickening of the gut. A few ulcers were also found in the ascending colon.

Cases of abscess of the left lobe of the liver are rare, they

are also difficult to diagnose. Here the evidence of an inflammatory process was early marked, the hepatic origin being strongly suspected: but the absence of enlargement, local pain, and the negative results of exploratory punctures were all very puzzling. The diaphragmatic implication pointed to the abscess being in the upper and back part, the position where these abscesses are so commonly found. When cardiac symptoms became marked a septic endocarditis was suspected.

The points of special interest I think are:—
(1) The occurrence of dysentery in England years after leaving a foreign station.
(2) The position of the abscess in the left lobe.

(3) The abscess in the right lung which did not directly

communicate with that of the liver.

The infection of the lung through the serous membrane without perforation is important. It is stated by Lafleur to occur but rarely. A certain amount of aerated tissue surrounded it, hence causing the masked pulmonary physical signs. The cutting off of this necrotic portion of the lung tissue by blocking of the surrounding bronchi is proved by the entire absence of any purulent expectoration, which was

carefully looked for throughout.

Considering the length of the case and the great destruction of lung tissue, the absence of any such evidence was very unusual, emphasising the fact stated by Lafleur, that the physical signs of hepato-pulmonary abscess are even more indefinite than those of a deep-seated hepatic one, often remaining so for a longer time. He says "that it is surpris-ing after death to find extensive lesions of lung and liver where physical examinations and exploratory aspirations had afforded but inconclusive evidence of suppurations of these organs.

(4) The pericarditis.

(5) The presence of amœba coli in the abscess fluid two days after the operation, and the sterile condition of this

It is difficult to understand how, with an absence of pyogenic bacteria, such excessive clinical evidence of septic infection is to be explained, and in what way did the secondary

abscess of the lung and the pericarditis originate.

It seems probable that the dysentery was directly due to the amœbæ coli, that these were conveyed to the liver, setting up the neurotic change there, and from there passing through the serous membrane to the lung, and that these amœbæ are able to secrete some toxin able to produce intense rigors, &c. The secretion from the lung tissue was not examined for amœbie, the *post-mortem* examination being made too long a time after death.

In cases of this kind the diagnosis has to be made by a process of exclusion. Liver abscess was recognised, but the position in the left lobe was not suspected. It was not until quite late in the case that there were any symptoms pointing to this, indicating the necessity of frequent and systematic

exploration of the whole organ.

Dr. Manson stated that under ordinary circumstances there was great difficulty in many cases in diagnosis of pus in the liver by needle punctures, but when the abscess had opened into the lung and the pus was being expectorated, the difficulties in the way of finding the seat of the liver abscess by puncture with the needle of an aspirator was increased manifold. Fluid resembling liver pus he had known to be drawn off by the aspirator, and yet the pus had been coughed up afterwards. He regarded the operation practised by most British surgeons as altogether too heroic. Unless the thorax were involved it is not necessary, nor is it good surgery, to treat a liver abscess as one would an empyæma. He had relied upon the trocar and cannula in the treatment of pus confined to the liver, and he had seen it used with excellent results by others. He had not met with the amœbæ coli in the sputum of patients suffering from abscess confined to the liver. Dr. Manson regarded leucocytosis not as an evidence of malarial infection when it is met with in liver abscess cases, but merely as an indication of an inflammatory process. Dr. Manson was at a loss to understand the serious hæmorrhage that had occurred in Bombay from puncture of the liver by the needle of an aspirator.

Major Ronald Ross mentioned a case of hepatic abscess he had seen in Liverpool, in which leucocythæmia, but no

evidence of malaria, was present.

Mr. CANTLIE said he had followed Dr. Manson's plan of treating liver abscesses by the trocar and cannula and the subsequent insertion of a large drainage-tube into the cavity with success. He had also seen it used many times by Turnbull, Cowie and Stedman with conspicuous success in Hongkong. Mr. Cantlie urged the use of the trocar and cannula as a method of treatment, as it could be used with safety and at an early stage of the disease. In out-of-the-way parts of the world it frequently occurred that the surgeon can have no skilled help, and under the circumstances to reach by a laparotomy, or a transthoracic path, the pus in the liver, is an undertaking that is apt to be deferred or put off altogether until it is too late. No surgeon would, however, hesitate to first put the needle of an aspirator into the liver, and having found pus, to thrust a large trocar and cannula along the track of the needle towards the seat of the abscess. Cantlie believes that with this instrument in the hands of a practitioner in the tropics, especially when no skilled assistance is obtainable, early search would be made for the pus, and many lives saved. He regarded the formation of an abscess in the lung or pleura subsequent to a liver abscess as a sign that the medical practitioner had delayed operation too long; it is a sequel to liver abscess which he would not say should never be allowed to occur, but it was one which, as the adoption of the use of the trocar and cannula came to be general, would be quite exceptional.

Colonel Kenneth Macleod said: I quite agree with Dr. Manson's remark on the subject of heroic surgery in cases of liver abscess. I also consider that in the great majority of cases resection of rib is unnecessary, or stitching of the edges of serous membranes. In lung cases in which filling of the pleural cavity or destructive abscess of lung has arisen as a secondary event, resection of rib is advisable. mention that in one case I derived assistance in diagnosis from the intercostal impulse caused by gentle coughing. This physical sign might be useful in many diseased con-

ditions of lung and pleura.

#### THE CYPRUS SPHALANGI AND ITS CONNECTION WITH ANTHRAX.

(CALLED LOCALLY "SPHALANGI BITE.")

By George A. Williamson, M.B., C.M.Aberd., Cyprus.

The so-called sphalangi of Cyprus is an insect, in general appearance resembling an ant of medium size. is divided into three segments, the head and the thorax being dull red in colour, and each about half the size of the abdomen, which latter is black, marked with spots or bands (amalgamated spots) of yellow. The abdominal segment in some carries at its extremity an elongated process, the "sting." Others do not have this process. The sting-bearers are apparently the females, the sting being a modified ovipositor. Those without stings are males. The length of the insect is one-third to one-half an inch, and the whole body is covered with fine hairs, visible under a magnifying glass. These hairs appear important, as they may carry infective material, for example anthrax spores, to an abraded surface. In early summer winged individuals are met with. All seem to lead a semi-subterranean existence and to be omnivorous, with, if anything, a preference for foul material. The sphalangi is met with only during the hot weather, from June to November.

#### IDENTIFICATION, &c., OF THE SPHALANGI.

Professor Trail, of Aberdeen University, to whom I sent a few specimens for identification, kindly sent me the following "(1) The insects all belong to a genus of Aculeeti (sting-bearing) hymenoptere, called Mutille. About 1,000 species have been distinguished, often by very slight characters, so that it is scarcely possible to determine the species except by comparison of good series with accurately named collections. There are not more than perhaps five or six specialists in Europe that could do so with certainty. The species are scattered over the world, especially in warm countries, and there are probably a good many species in Cyprus. I think there are three species represented in your tube—namely, the large one with sting hidden, the small one with sting out, being distinct; and the other two probably belonging to one species, despite difference in size.

"(2) Life histories alike in all species of Mutille so far as is known. Thus the specific names are of little importance from your point of view, except for completeness, and that would require an accurate and detailed study of the genus in Cyprus. All species whose life-history is accurately known live as larvæ—their metamorphosis being complete—in the cells of the true bees—some in those of honey bees, others in those of the very numerous kinds of solitary bees—eating the food prepared by the bees for their own larvæ. When fully fed they become pupæ in the cells, and the perfect insects emerge from the nests of the social bees or the burrows of the solitary species.

"(3) The females are always wingless. The males are winged of all except a few species. I think those sent by you are all females, the sting being pushed out in two and

retracted in the other two.

"(4) The females can and do sting in self defence."

#### BELIEF AS TO EFFECTS OF "SPHALANGI BITE."

It is firmly believed throughout the island that the sphalangi can sting or "bite" (as the literal translation of the Greek word makes it), and that the effects are generally serious and may be fatal; many cases are on record, and deformities as the results of the sting, are frequently met with. I was unable to accept the story that the sting of itself could cause such terrible results, and subsequent experience of cases has led me to what seems to be the correct explanation of the injuries caused by the sting.

#### EXISTENCE OF ANTHRAX.

Before going further I should like to point out that the disease known in the island as "phylangari"  $(\phi \lambda \alpha \gamma \gamma \delta \rho)$  in sheep is really anthrax. This I have no hesitation in stating, having examined the blood of animals suffering from phlangari, and finding it crowded with unmistakable anthrax bacilli. I have also found the disease in horses, two cases, both fatal. Unfortunately, the carcasses of animals dying of phlangari are too often left to lie where the animal died, the skin being removed.

(To be continued.)

## Rebiews.

LA PESTE ET SON MICROBE (Plague and its Microbe), par Professor Netter (Paris), Georges Carré, et C. Naud. Paris, 1900.—This publication is thoroughly up to date, and conveys valuable information concerning the modern pandemic of plague. The illustrations are well done, the maps show the localities affected by plague, and the effects of vaccination are carefully recorded.

INTRODUCTION TO THE STUDY OF FEVERS OF WARM COUNTRIES, by Dr. Emile Legrain. Paris, 1900.—Part I. In his introduction the author summarises the disorders which—justly or unjustly—are generally

attributed to malaria; enteritis, hepatitis, splenitis, cystitis, nephritis, urethritis, nervous affections, and finally, malarial chancre. He asserts that the action of quinine is not steadfast in so-called malarial fevers. He touches on the bilious forms of malaria, such as *vomito negro*, the algide forms of cholera, the hyper-febrile accesses of typhoid fever, heat strokes, and the comatose forms of uræmia.

Part II. is largely devoted to the study of the action of quinine and to intermittent fever in Algeria, which he considers to be a benign affection. At the commencement of the fever he does not employ quinine. A dose of quinine given at the commencement of an access of fever, has no influence on the latter, but induces a subsequent febrile condition, lasting five days. The dose should be 0.25 grams for quartan, 2.50 gram for quotidian, and 2 grams for tertian fever. The author, from his own experience, is of opinion that the intra-cellular parasites are due to alterations of the protoplasm, the sporozoites are nothing but particles of diseased corpuscles, the crescents are but red blood corpuscles, of which part has been expelled; the melaniferous pigment is only to be met with in inebriates, and are not pathogenic, and more to the same effect.

Part III. deals with those forms of so-called malaria uninfluenced by quinine. According to this author these comprise: (1) the remittent fever of bacillus coli, and the entero-colitis of the tropics (in Dr. Legrain's opinion these are ameliorated by the use of betel and salol); (2) the group of medical septicæmias; (3) Mediterranean or Malta fever, which is quite distinct from either typhoid fever or malaria; (4) illnesses of the type of "vomito negro;" (5) those various ailments attributable to alcoholism, syphilis, and tuberculosis; and (6) cachexias due respectively to the abuse of alcohol, disorders of the blood such as leucæmia, anæmia, pernicious anæmia, and dis-

orders of nutrition.

Dr. Legrain has come to the conclusion that paludism is a myth, a proteus-like illness representing only a small part of the disorder due to tropical climate. It is only more minute study of these diseases which will lead to more efficacious and rational treatment. Sulphate of quinine should disappear from the medicine chest of colonial practitioners.

## Current Miterature.

#### ABSCESS OF LIVER.

Two cases recorded in the Report of the Principal Medical Officer of Hongkong for 1899:—

Case 1. Abscess of Liver; Operation; Recovery.—An English officer in the mercantile marine, aged 39, was admitted to hospital on February 7.

Previous history.—He had had an attack of dysentery in 1881. Last March was laid up with an attack of malarial fever on the West Coast of Africa and had two relapses whilst in England.

Present history.—For the last five or six months has been troubled with pain in the region of the liver, which four days ago became much more severe and was accompanied by pain in the right shoulder. Liver dulness is increased with distinct tenderness in lower intercostal spaces on right side. Breath very short. Temperature 100.8° on the 9th. Under chloroform an aspirating needle has proved the presence of pus; an incision was made in the ninth interspace and a drainage tube inserted. The temperature at once came down to normal and remained so up to twenty-fifth day, when there was a slight rise (100°) owing to a small accumulation of pus in the rapidly closing sinus. This was evacuated, and the patient was discharged quite cured on the thirty-sixth day, having gained 8 lbs. in a week.

Case 2. Abscess of Liver. Removal of large gall stone. Recovery.—Ng Wan, Chinese lukong, aged 38, was admitted on May 30. He had been ill with fever four days. The liver dulness was increased two fingers' breadth below the cartilages, and was very tender especially over the seat of the gall bladder. There was dulness in the right chest posteriorly, with feeble sounds. He had never had dysentery. The temperature varied from 99° in the morning to 104° in

the evening.

On June 6 the liver was explored and pus found, and next day under an anæsthetic an incision was made below costal cartilage of seventh rib in nipple line, and a tube was inserted into an abscess, and two pints of pus evacuated. The temperature dropped at once and kept normal. On August 16, as there was still a discharging sinus, the patient was put under chloroform again, and the sinus scraped. A calculus was felt and part removed. On August 21 he was again operated on, and after some trouble a calculus was removed in pieces weighing 420 grains. The patient rapidly improved in weight from 114 to 127 lbs., and general health, and was discharged on September 16 with the sinus quite healed, and the liver dulness normal. Throughout the case there was no jaundice or any bile discharged through the sinus.

## Acws and Notes.

Maximilian Frank Simon, M.D., on retirement as Principal Civil Medical Officer of the Straits Settlements, has been gazetted a C.M.G. We congratulate Dr. Simon upon the well-deserved honour bestowed upon him. Dr. Simon's name stands high as an authority on tropical diseases, and his administrative ability has procured for him many encomiums. We hope Dr. Simon will continue to take an active interest in the branch of medicine he has so long and so successfully devoted himself to, and that many years of useful work may be his. The Editors have been frequently indebted to Dr. Simon for several excellent contributions, and they can assure him that the readers of the Journal appreciate highly any article emanating from so reliable a source.

#### EXCHANGES.

Annali di Medicina Navale. Archiv. für Schiffs u. Tropen Hygiene. Archives de Medicine Navale.

Archives Russes de Pathologie, de Medec., Clinique et de Bacteriologie.

Australasian Medical Gazette.
Boletin de Medicina Naval.
Boston Medical and Surgical Journal.
Bristol Medico-Chirurgical Journal.
British and Colonial Druggist.
British Journal of Dermatology.
British Medical Journal.
Climate.

Clinical Journal. Clinical Review.

Giornale Medico del R. Exercito.

Hongkong Telegraph.
Il Policlinico.
Indian Engineering.
Indian Medical Gazette.
Indian Medical Record.
Janus.

Journal of Balneology and Climatology. Journal of Laryngology and Otology.

La Grèce Médicale.

Lancet. Liverpool Medico-Chirurgical Journal.

Medical Brief. Medical Missionary Journal.

Medical Record.
Merck's Archives.

New York Medical Journal. Pacific Medical Journal.

Polyclinic. Public Health. Revista Medica de S. Paulo.

South African Medical Journal. The Hospital.

The Medical and Surgical Review of Reviews.

The Northumberland and Durham Medical Journal.

Treatment.

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#### Motices to Correspondents.

1.—All communications will be acknowledged in the JOURNAL under the heading "Letters and Communications Received." Contributors who do not see their names in the list should communicate forthwith with the Editors or Secretary.

2.—Manuscripts sent in cannot be returned.

3.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

4.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

5.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Editors.

# The Journal of Tropical Medicine.

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#### Original Communications.

OBSERVATIONS ON MALARIA AND MOS-QUITOES IN QUEENSLAND AND BRITISH NEW GUINEA.

By Sir Francis P. Winter, C.M.G. Chief Judicial Officer, British New Guinea.

I VENTURE to address you on a subject which probably I am not competent to write about, namely, mosquitoes and malarial fever. I possess no scientific knowledge either of mosquitoes or of malarial fever, but having resided many years in Queensland and in New Guinea, I have made the acquaintance of both of these afflictions.

Judging by the tenor of some of the articles on the above subject that have appeared in your journal, it would seem that the writers thereof had obtained much of their knowledge from the conditions existing in tropical localities in which shallow pools and marshes were numerous. Such a country is, as a rule, congenial both to mosquitoes and to malaria. Hence to my unscientific mind this kind of country does not seem to be the most suitable one in which to seek facts that will countenance or discountenance the theory that the malarial parasite is introduced into the human body solely by the direct or indirect medium of the mosquito. Researches in a country in which malarial fever is common, but in which mosquitoes are unknown, or at least are very uncommon, would, it seems to me, be more likely to lead to conclusive proofs, one way or the other, than researches in a country that is a congenial home of the mosquito and of malaria. To show that there may be such countries I give some of my own experiences.

Some twenty years ago I lived in the little township of Clermont on the Peak Downs in Queensland, the latitude of which is about 23 degrees south, and the longitude about 148 degrees east. Compared with the coast country, these downs form a plateau some 800 feet above sea level. In summer it is very hot there in the day time, but fairly cool at night. In winter it is warm in the day time, but the nights are cold, the thermometer often falling below freezing point. To the best of my recollection I never felt or saw a mosquito during the two and a half years that I was at Clermont, nor ever heard of any one else doing so, although I was told that in summer they sometimes made their appearance at Copperfield, a small settlement distant from Clermont some four miles. I visited other places on the Peak Downs, but so far as I can remember I never came across mosquitoes at any of them. We slept under mosquito nets at night, even in mid-winter, but not with the view of keeping off mosquitoes. I camped out with a large party from the township for two nights alongside a chain of pools, in the middle of summer. No one brought a mosquito net and no one was troubled by mosquitoes.

Malarial fever was common at Clermont, and all over the Peak Downs. Attacks usually took place in the latter part of autumn, in winter, and in the early part of spring. It was seldom that any one suffered from fever in the summer time. I had two slight attacks, the first attacks of malarial fever I ever had. Whilst I was at Clermont what might almost be termed a natural phenomenon was coincident with an outbreak of malarial fever. One morning in autumn or winter. I forget which, an odour resembling the stench from a foul drain or a water-closet pervaded the whole place. It was caused by an exhalation

from "gidiya" trees growing in a scrub half a mile away. This was my sole experience of this peculiarity of the gidiya tree. The odour disappeared in a few hours. On the day in question no one was suffering from malarial fever in Clermont, but on the following day quite a number of the town's people had attacks of it.

The Peak Downs, as a whole, is a dry district; the rainfall is scanty as a rule, and much of the soil is porous. As regards Clermont, a long narrow, rather shallow pool, which always had water in it, ran through the town. Some persons drank the water of this pool, but most people drank water obtained from iron tanks, filled by rain or from wells.

It seems to me that medical men living on the Peak Downs, or in dry districts in Queensland, where malarial fever is common, might be able to furnish valuable information on the question, of whether malarial fever is due solely to mosquitoes.

I cannot say that my New Guinea experience throws much light on the subject of the introduction of the malarial parasite into the human body by the agency of the mosquito, but it certainly proves that mosquito bites are not in all cases soon followed by malarial fever, even in a country in which the parasite must be very common. I was not attacked by malarial fever until after I had been a year and eight months in the country. A few months after I arrived in the country, mosquitoes were for a good while very numerous and bloodthirsty, and I was frequently bitten in the day-time and in the night time. I think it most probable that during this year and eight months, most of which I passed at Port Moresby, I often drank water in which mosquitoes bred. The water supply of the settlement is rain water collected in rain tanks, and mosquitoes breed in

The ratio of malarial fever in different localities in New Guinea bears no proportion to the ratio of mosquitoes in these localities. In some districts where malarial fever is common mosquitoes are not. But as probably all Europeans who reside in these last named districts have, in order to get to them, passed through localities in which the mosquito abounds, and none of these Europeans have been long in these districts, one cannot draw any satisfactory conclusions from attacks of fever within these districts.

To go back to the question of experiments carried out in localities that are congenial to the malarial parasite and to the mosquito. If the mosquito hypothesis is left out, I presume it will be granted that the more abundant and vigorous the parasite is in a given district, the more likely is it to find its way through some channel or other into the bodies of the people that dwell in that district. I also presume that it will be admitted that the more mosquitoes abound in any given district, the more likely are the people that live in such district to be bitten by mosquitoes, or to eat food, or to drink water that has been infected by the mosquito. Therefore the more the mosquito and the parasite abound in a district, the more difficult must it be to prove that the mosquito is the only medium through which the parasite gets into the human body. If the experiments can be made on a human being originally free from the parasite, after he has lived for some

time in a district congenial to the mosquito and the parasite under conditions which precluded the possibility of any connection between him and the mosquito, then such a district may be the best place to experiment in. But I must confess that I regard the attainment of this possibility in a mosquito infested country as very difficult.

I will conclude by giving an instance of how one may be bitten by mosquitoes without being aware of it, and under conditions that apparently rendered it impossible for a mosquito to bite one. I have gone to sleep in a bed, protected by a mosquito net. There were no mosquitoes within the net, and no orifice through which they could get inside it. Whilst asleep I have stretched out my arm, and thus brought my hand in contact with the net. The mosquitoes outside the net thereupon bit my hand through the net. I have several times been awakened by the smart of the bites inflicted in this way. Given a sound sleeper or a person not much irritated by mesquito bites, or bites that produce little irritation, and the bitten slumberer on waking in the morning would not know that he had been bitten, and probably would be prepared to assert that he could not possibly have been bitten.

# MOSQUITOES AND MALARIAL PARASITES IN HONG KONG.

By John C. Thomson, M.D., M.A., and T. M. Young, M.B.

THE following Report on the Prevalence of Malarial Fever at Tai Po,\* New Territory, is published by command of the Hong Kong Government, Nov., 1900.

Drs. Thomson and Young state that before commencing their investigation the following statistics as to the prevalence of mosquitoes at Tai Po during September, October and part of November, had been placed at their disposal.

Date.		Mo	squitoes Car	ight.	Anopheles	١.	Culex.
September	4		50		1		49
. ,,	19		11		4		7
,,	24		62		23		39
October	4		50		5		45
,,	17		37		33		4
,,	21		44		27		17
November	12		55		33		22
			_		-		-
	Total		309		126		183

i.e., Anopheles, 40 per cent.; Culex, 60 per cent.

By special request there had been no selection of specimens, all those caught on the various dates named being sent for examination and classification; so that during the period between September 4 and the date of our visit 40 per cent. may be taken as the actual average prevalence of the *Anopheles* among all mosquitoes found. The species is a larger one than that most common in Hong Kong, and we identify it as *Anopheles sinensis*.

From police records placed at our disposal we ascertained that the cases of fever among the police during the last twelve months have been as follows:—

<sup>\*</sup>Tai Po is in the New Territory recently acquired by the British Government on the Chinese mainland opposite the island of Hong Kong.—Ed. Jour. Trop. Med.

			No	of C	ases.	Average Police	Strength.
November	(half)	, 1899		5		2 Europeans,	7 Indians
December,	1899			2		,,	,,,
January,	1900			1		,,	,,
February	,,			2		,,,	,,
March	,,			2		"	,,
April	"			0		,,,	,,
May	,,			2		,,	,,
June	,,			5		,,	,,
July	,,			13		3 Europeans, 2	2 Indians
August	,,			27		,,	11
September	,,			28		,,	,,
October	,,			17		,,	,,,
November	(half)	, 1900		1		1 European, 1	4 Indians

It is noteworthy, on comparison of this with the preceding table, that while the enumeration of Anopheles rises to 60 per cent. of all mosquitoes found at the date of our arrival at Tai Po, malarial fever had almost disappeared. We attribute this rapid fall in the number of cases of fever during the period of the cutting of the second rice-crop, which we found in progress, and during which the previous experience of the police would have led to the expectation of an increased number of cases of malaria, chiefly to the recent adoption of vigorous prophylactic medication with quinine on two days successively at intervals of seven days.

We made careful search in all directions around the Government buildings and matsheds for breedingplaces of *Anopheles*, our investigation extending over the adjoining paddy-fields as far as the river to the north, to the villages on the west, and across the river and up certain of the ravines beyond it on

the south side.

We show the results of our search on the accompanying rough sketch-map,\* the places where Anopheles larvæ were found being indicated with red ink. We believe that the negative results in the paddy-fields and in the whole river valley to the south were probably chiefly due to the washing away of larvæ by the rain-storm which accompanied the typhoon three days before our visit. The positions in which larvæ were actually found abundantly were in the narrow ditches around the uppermost paddy-fields, where the rain-washing would be least marked, and in a marshy sluggish stream, into which the paddy-fields drain, to the north-west of the Government buildings, where also the disturbance by the storm would be at a minimum.

We direct special attention to two important points:—(1) That the breeding-pools that proved most resistant to the severe strain of the recent rainstorm, and which even at this late date in the year contain abundant larvæ, are within eighty yards from the Police Station and forty yards from the matshed occupied by the Civil Staff; and (2) that the marshy stream above referred to is a permanent

and prolific breeding-ground.

We examined under the microscope the blood of ten children from the village nearest to the Police Station. At first we had some difficulty in obtaining the necessary specimens, but having finally persuaded a chair-coolie to bring his own son we presented the child with a five-cent piece, and let it be known that we were willing to pay for blood at the rate of five cents per drop, whereupon more children turned

up than our time permitted us to deal with. Results were as follows:—

Sex.		Age.	Type of Parasite Found.
Male	0.2	 3	 Benign Tertian Gamete.
Female	4	 8	 Benign Tertian Rosette.
Male		 14	 Nil.
Male		 9	 Nil.
Male	/	 3	 Aestivo-Autumnal Gamete.
Male		 15	 Nil.
Female		 5	 Young Aestivo-Autumnal.
Male		 14	 Young Aestivo-Autumnal.
Male		 9	 Nil.
Male		8	 Nil.

Thus in 50 per cent. of the cases examined we found the parasites of malaria; and when it is borne in mind that the amount of blood examined in any case did not exceed the size of a pin's head, and that in no case did time allow us to take a second specimen, it will be apparent that the actual prevalence of malaria among the village children is probably greater than the percentage above named. Two cases were of benign type and three malignant, and while all five children were infective to the mosquito, rendering any Anopheles feeding upon them capable of a few days later transmitting the disease to other persons, in two cases the form of the parasite that actually came under our observation was the gamete, i.e., the form which when ingested by the mosquito is capable of undergoing metamorphosis in the body of that insect.

In the abundance of mosquitoes of the Anopheles genus above described, with their breeding-grounds almost close up to the Government buildings, and in the near proximity of an extensively infected native population, by which many of these mosquitoes are being continuously rendered infective to healthy persons who may be bitten by them, we have the factors that account sufficiently and conclusively for the fevers that have prevailed among the Government

officers at Tai Po.

We are of opinion that the seasonal increase of fever cases that has been observed at the time of ploughing, and at the period of harvesting the two rice-crops, is due to the disturbance at these times of mosquitoes usually resting among the grass or growing paddy, and feeding on Chinese coming within their reach, such disturbance resulting in their flying further afield and finding their way in larger numbers to the houses on the hills.

Having given our most careful consideration to the facts above stated, in all their bearings, we have come to the conclusion that all temporary measures for the improvement of the health of the station at Tai Po should be superseded with as little delay as possible by a definite scheme for the complete eradication of the breeding-places of the *Anopheles* mosquito over a wide area surrounding the Police Station.

The district involved is too large to be efficiently dealt with by any culicidæ; the cutting and clearing of long grass and shrubs from the hillside is only a subsidiary measure, though undoubtedly a useful one; the mosquito curtain, especially if put down an hour before dusk and kept down as long after sunrise, is a valuable preventive of the approach of mosquitoes at night, but with definite limits to its usefulness; and drugging with large quantities of

<sup>\*</sup> Not printed

quinine is manifestly undesirable as a permanent

method of dealing with the matter.

We consider that we have no alternative but to recommend, as the one means of rendering the Police Station and its neighbourhood more healthy as regards malaria, the acquirement and reclamation or efficient drainage of all the paddy-fields within a radius of 250 yards from the foot of the hills on which the houses stand, including to the north-west the whole of the marshy water-bed to which we have already referred as a large permanent breeding-place of the malaria-bearing mosquito.

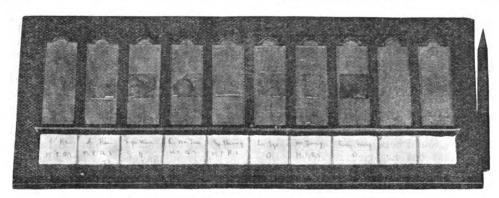
Finally, we recommend that the matsheds in use for the accommodation of the Civil Staff, affording as they do ready cover for adult mosquitoes, and also rendering the inmates liable to chills at night, should be replaced by permanent buildings; and we venture to suggest for the consideration of His Excellency that a more suitable and healthier site than those that have been proposed is available for the purpose. Observing that no permanent foundations for these buildings have yet been laid, and that an island, 900 yards due east of the Police Station,

#### A SLIDE-TRAY FOR WARD USE.

THE accompanying illustration shows a very con-. venient Slide-tray for ward purposes, devised by Dr. Chung, resident surgeon in the Tung Wah Hospital, Hong Kong, for his own use in making blood examinations. It consists of a solid piece of teakwood, 1 ft. 21 in. long by 6 in. broad, in the upper part of which ten spaces for slides have been hollowed out, while below there is inserted a long narrow strip of Chinese porcelain slate, a little over an inch broad. He carries the tray round the wards, jotting with a lead pencil the name of the patient below the corresponding slide. The slides are examined at leisure, and similar jottings of the results of examination for the parasites of malaria, in terms of Messrs. Bale, Sons and Danielsson's Malarial Chart, made to be entered up in the permanent records when convenient. The tray has proved exceedingly useful in actual practice, and I have asked Dr. Chung's permission to send a note regarding it to THE JOURNAL OF TROPICAL MEDICINE.

Hong Kong, Dec. 13, 1900.

J. C. THOMSON.



SLIDE-TRAY FOR WARD USE, DEVISED BY DR. CHUNG, HONG KONG.

and well removed from any considerable native population, is being connected with the mainland by a solid road and bridge, in order that a pier may be constructed from it to reach deep water, we made a careful examination of this island. We found no larvæ of mosquitoes, and should any breeding-places come to light after the thick undergrowth is cleared away, they could be readily eradicated. The location would probably be found convenient for executive purposes on account of the proximity of the proposed pier, and its isolation would render it much less malarious than either of the proposed sites even after the improvements we have suggested for the existing Police Station have been carried into effect.

It would be further conducive to the health of the Civil Staff, if the building were erected in two storeys, the ground floor to be used for office purposes, and residential quarters provided entirely on the upper floor.

MALARIA AND ELEPHANTIASIS IN RELATION TO MOSQUITOES IN THE MARQUESAS ISLANDS IN THE PACIFIC ARCHIPELAGO.

In a letter to the Lancet dated January 18, 1901, by Mr. H. D. O'Neill, an interesting observation by Robert Louis Stevenson is referred to, on the subject of mosquitoes and their association with filaria and malaria: "In Atuona (Marquesas Islands), a village planted in a shore-side marsh, the houses standing everywhere intermingled with the pools of a tarogarden, we find every condition of tropical danger and discomfort, and yet there are not even mosquitoes, nor even the hateful day-fly of Wuka-Niva, and fever and its concomitant, the island fe'efe'e, are unknown.

The absence of fever and elephantiasis from a locality which is also free from mosquitoes is a most interesting and suggestive observation.

#### THE QUEEN'S DEATH.

THE life and character of Queen Victoria have been so admirably and fittingly expressed by the statesmen who spoke in the House of Lords and the House of Commons on January 25, 1901, that they may be truly said to have truly indicated the depth of feeling and sorrow which at the present moment pervades the realm. The Marquis of Salisbury, on moving an address of condolence, said:—

"We are echoing the accents of sorrow which reach us from every part of the Empire and every part of the globe, and which express the deep and heartfelt feeling—a feeling deeper than I ever remember-of the sorrow at the singular loss which, under the dispensation of Divine Providence, we have suffered, and of admiration for the glorious reign and the splendid character of the Sovereign whom we have lost. My lords, the late Queen had so many titles to our admiration that it would occupy an enormous time to glance at them even perfunctorily; but that on which I think your lordships should most reflect, and which will chiefly attach to her character in history, is that, being a constitutional monarch with restricted powers, she reigned by sheer force of character, by the lovableness of her disposition over the hearts of her subjects, and exercised an influence in moulding their character and destiny which she could not have done more if she had had the most despotic power. She has been a great instance of government by example, by esteem, by love; and it will never be forgotten how much she has done for the elevation of her people, not by the exercise of any prerogative, not by the giving of any commands, but by the simple recognition and contemplation of the brilliant qualities which she has exhibited in her exalted position. My lords, it may be, perhaps, proper that those who, like noble lords opposite and myself, have had the opportunity of seeing the close workings of her character in the discharge of her duties as Sovereign, should take this opportunity of testifying to the great admiration she inspired and the great force which her distinguishing characteristics exercised over all who came near her. She always maintained and practised a rigorous supervision over public affairs, giving to her Ministers her frank advice and warning them of danger if she saw there was danger ahead; and she certainly impressed many of us with a profound sense of the penetration, almost intuition, with which she saw the perils with which we might be threatened in any course it was thought expedient to adopt. She

left upon my mind, she left upon our minds, the conviction that it was always a dangerous matter to press on her any course of the expediency of which she was not thoroughly convinced; and I may say with confidence that no minister in her long reign ever disregarded her advice, or pressed her to disregard it, without afterwards feeling that he had incurred a dangerous responsibility. She had an extraordinary knowledge of what her people would think. I have said for years that I always thought that when I knew what the Queen thought I knew certainly what view her subjects would take, and especially the middle classes of her subjects. Such was the extra-ordinary penetration of her mind. Yet she never adhered to her own conceptions obstinately. On the contrary, she was full of concession and consideration: and she spared no effort-I might almost say she shrank from no sacrifice-to make the task of conducting this difficult Government more easy to her advisers than it would otherwise have been. We owe her gratitude in every direction—for her influence in elevating the people, for her power with foreign Courts and Sovereigns to remove difficulties and misapprehension which sometimes might have been dangerous; but, above all things, I think, we owe her gratitude for this, that by a happy dispensation her reign has coincided with that great change which has come over the political structure of this country and the political instincts of its people.

She has bridged over that great interval which separates old England from new England. Other nations may have had to pass through similar trials, but have seldom passed through them so peaceably, so easily, and with so much prosperity and success as we have. I think that future historians will look to the Queen's reign as the boundary which separates the two states of England—England which has changed so much and recognise that we have undergone the change with constant increase of public prosperity, without any friction to endanger the peace or stability of our civil life, and at the same time with a constant expansion of an Empire which every year grows more and more powerful. We owe all these blessings to the tact, the wisdom, the passionate patriotism, and the incomparable judgment of the Sovereign whom we deplore. I have also to move that we present our congratulations to his Majesty on his accession to the Throne, and to convey the assurance to his Majesty of our loyal attachment to his person, and, further, of our earnest conviction that his reign will be distinguished, under the blessing of Providence, by an anxious desire to maintain the laws of the kingdom and to promote the happiness and liberty of his subjects.'

THE

# Journal of Tropical Medicine

FEBRUARY 1, 1901.

#### THE CAUSE OF BERI-BERI.

CAPTAIN E. R. ROST'S INVESTIGATIONS.

An important contribution to medical literature as to the cause of beri-beri, has been made by E. R. Rost, Captain I.M.S., and published in the *Indian Medical Gazette* for December, 1900. This is not the first time that beri-beri has been associated with rice eating, and still further, with rice of an inferior quality, but all our previous attention has been directed to rice itself as a food, and as a physiological factor in inducing a condition of blood or tissue in some way conducive to the development of beri-beri.

Captain Rost has, however, drawn attention to the possibility of infection conveyed by a micrococcus inhabiting rice, and he has, acting in this belief, experimented in a careful and scientific manner in elucidation of the possibility. Rice liquors of various kinds and from different sources were examined, and the organisms found in these several liquors proved to be identical. In the yeast also, which the Chinese in Burmah obtain from Singapore and use to ferment their rice liquors with, the same organism was found. The evidence, however, goes farther, and Captain Rost asserts that he found in the blood and the cerebro-spinal fluid of beri-beri patients, the same organism as he met with in rice-water.

The morphology of the organisms found in the microscopic examinations, was observed in the cultures produced "in sterile rice broth, in beef broth, in blood, in hydro-thorax fluid, and in acitic fluid." It was noticed in carrying out control experiments "that it was with extreme difficulty that the organism could be killed, and a temperature of 220° F. for nine hours was found to be necessary to kill off the spores. Cultures from several media were injected into fowls; those from rice-water gave rise to reactions in the fowls; those from cerebro-spinal fluid, and from blood in broth, in blood serum and in rice

broth, produced the organism in the blood and in the spinal cord of the animals experimented upon.

"The organism is a diplo-bacillus which generally is seen as an angular organism; it develops by spores, the spores split into two, become elliptical and grow out into rods."

Between the starch cells these angular diplobacilli are occasionally to be seen, as well as micrococci, which (latter) Captain Rost claims are the spores of the organism.

The organism is readily stained by carbofuchsine. It is very active and moves along wagging one end in front of the other.

As the result of repeated examination of the blood of thirty-two cases of beri-beri the organism was found "in every one of the cases on each occasion." Owing to the rod-like configuration of the organism it is possible that during the microscopic examination of fresh specimens only the rounded end of the rod presents itself, but after prolonged watching the organism may be seen to show itself lengthwise.

Blood after incubation for twenty-four hours at 37° C. is found full of the characteristic organisms, and in cover glass preparations ringed by vaseline the organisms have been noticed to increase in numbers.

Captain Rost checked his experiments by "control" fowls. He visited the native bazaars and examined the methods of making the rice liquors. He noted that the chief frequenters of these shops suffered most from beri-beri; he, in fact, made a thoroughly scientific enquiry into the subject, and if the chain of bacteriological enquiry is as yet not quite complete, he has certainly sufficient grounds to bring it forward as a working hypothesis that beri-beri is due to the micro-organism he describes.

TWENTY-FIVE THOUSAND DEATHS FROM PLAGUE IN THE MYSORE STATE.—Lord Curzon, Viceroy of India, has stated that since the appearance of the bubonic plague, in 1898, 25,000 deaths from the disease have occurred in the Mysore State.

THE Tuberculosis Congress, which is to open in London on July 22, is to be a widely-attended function. Professor Koch, of Berlin, will be among the speakers.

#### THE REPORTS OF THE MALARIA COM-MITTEE OF THE ROYAL SOCIETY.

THREE reports have up to the present been issued by the committee appointed by the Royal Society to inquire and report upon malaria and its prophylaxis. During the year 1900, reports were issued on July 6, August 15, and December 31. Drs. C. W. Daniels, J. W. W. Stephens, and S. R. Christophers, have been the chief contributors to the report, and some valuable additions to our knowledge of malaria have resulted. The localities in which the investigations were conducted were chiefly in West Africa, but information gained in other malarial countries has been freely taken advantage of.

MALARIA AS IT AFFECTS NATIVE CHILDREN.—The immunity claimed by some observers in the case of natives is not borne out by the evidence contained in this report. It would appear that the adult native is less prone to the attacks of fever than are European immigrants of corresponding ages, but the explanation of this is one of the points which the Malarial Committee has thrown considerable light upon. From researches in Lagos and Accra by Christophers and Stephens, the infectivity was

proved to be as follows:

Seeing that the number of parasites varies considerably during a series of investigations, being met with one day and found absent the next, it may be safely stated, that the condition of infection in children may be termed as being constant until the age of ten or twelve years is approached. This period—ten years—is termed the "age limit" of constant infect.on by Christophers and Stephens. A significant fact reported is that children may have the æstivoautumnal parasites in their blood and yet appear in excellent health, and need not suffer from fever. This observation confirms a remark made some time ago now by a well-known tropical practitioner, "that all persons in malarial countries have the malarial poison in their blood, and that it only requires some exciting cause, such as chill, over-exertion, or illness, to set the toxic influence free and generate fever. This condition of infection of young children without febrile disturbance gives rise to several speculations. This may be due to a natural insusceptibility of the native African to malaria, or it may be due to an immunity transmitted from the parent to the offspring. As regards the immunity of adults, it is stated: "We have further a condition of active immunity in the adult native, an immunity acquired as the result of many years (ten) of infection with parasites. The immunity is accompanied by a progressively scantier development of parasites, and it is comparable to that described by Pawlowsky for infection with micro-organisms."

The Commonest Species of Anopheles in tropical Africa is the A. funestus—the small "black" mosquito. It is met with at all heights up to 5,600 feet in some localities, and it has been shown to harbour malarial parasites.

The Larvæ of Anopheles are mostly met with in

pools, which, however, may be merely of a temporary character, but they may be found in brooks and even in brackish water containing 0.6 per cent. of salt. In places remote from human habitations Anopheles were found, but in much fewer numbers than in the

neighbourhood of villages.

The Continuance of the Species .- The question of how the Anopheles survive the dry season has long At one time it was proved a vexed question believed that the ova lay dormant in the dry earth and developed with the onset of rain. This belief, however, is combated by observations in nature and by experiment. Ova of anopheles after being desiccated on blotting paper for a little over forty-eight hours could not be hatched. Earth collected from dried-up pools, in which the mosquitoes had deposited their eggs, did not give any evidence of larval development when water was added to it. On the other hand, adult anopheles were found during the dry season hidden away in the most secluded portions of native huts, and in these long-lived anopheles ova were found in a state ready to be deposited, and which no doubt were deposited when the return of the rains afforded suitable pools for the purpose.

Anopheles harboured the malarial parasites in some localities in every individual mosquito examined. This was especially the case in native quarters; and the proportion of children infected varied directly with the facility afforded the mosqui-

toes to breed.

Prophylactic Measures.—The several observers agree that the infection, of human beings and of mosquitoes, is so general in the parts of Africa where their investigations were carried on, that at present the stamping out of malaria by either medicine or by sanitary measures seems hopeless; the utmost that can be done is to ascertain-

How to Protect Europeans from Malaria .- The

recommendations are: -

(1) To use mosquito nets slung from the top of the bed and tucked in under the mattress. The bellnet, and attempts to maintain the hanging net in position by the bottoms being shotted, are condemned as inefficient.

(2) The mosquito "house" around the bed, or a mosquito-proof room, are considered efficacious provided the mesh of the gauze is sufficiently fine.

(3) Protection of the feet and ankles from the

attacks of mosquitoes is essential; this may be accomplished by high boots, double socks, &c.

(4) Fumigation of dwellings and of boats at

regular intervals.

(5) The separation of European from native quarters in towns and villages by at least 400 yards, as it is proved mosquitoes can fly considerable distances.

(6) European convalescents from fever should be carefully guarded against the attacks of mosquitoes, both for their own sakes and in consideration of the possibility of being a source of infection to their neighbours.

All the contributors to the report agree "that malarial fever is a contagious disease contracted through the medium of the mosquito from the native

child."

#### THE MARY KINGSLEY SOCIETY OF WEST AFRICA.

THE desire has been very widely expressed among Miss Kingsley's many friends, and among the still larger number of those who knew her through her writings and lectures, to establish a permanent Memorial to her.

It is in a great measure owing to Miss Kingsley's writings and her absolutely unique researches into native customs and institutions that so much interest has recently been taken by the general public in West Africa. She herself took a deep interest in all that might in any way tend to the improvement of the conditions of life in that part of the world, both of Europeans and of the natives.

Many of Miss Kingsley's friends desire that her name should be associated with a Society for the study of Native Customs and Laws, which was her first object and occupied the greatest part of her time and energy, and that "The Mary Kingsley Society of West Africa" should be established to stimulate, research and to collect from all sources

information concerning West Africa.

Miss Kingsley held that the right way to bring out the full value of British West Africa is not in the direction of trying to force European civilisation and customs on natives who already have a different, if rudimentary, social system of their own, but first to study this indigenous system, which must to some extent be suited to its environment, and then to select from this, and to develope, the better and more useful elements. It is believed that much information of the required kind as to West African sociology is already on record, scattered through the works of the older writers on those parts, as well as in more recent books of travel, in papers published in periodicals, in blue books, and in official reports; and a very great deal more may still be gathered by Government officials, traders, missionaries, travellers, and by the small but remarkable band of natives who are already educated. The Society, however, would not confine its papers exclusively to the subjects of tribal institutions and customary usages, but would be prepared to consider any article that might aid towards throwing light on the social conditions of the country.

It is proposed that the Society should employ a trained ethnologist both to collect and arrange in scientific form the material which is thus already on record, and to institute and direct research for further material of the same sort; and, after the manner of the Royal Asiatic Society, to publish periodically the results which it obtains, and thus provide additional knowledge by which European relations with West Africa may be most safely and effectively directed, with profit both to the natives and to the Empire. The publication would take the form of a Journal, to be issued quarterly to subscribers of One Guinea annually. Any special help given toward the initial expenses which will have to be met would be most important and welcome. And the Committee, having regard to this original character and purpose of the Society as a Memorial to Miss Kingsley, would be very glad to obtain some additional aid upon this consideration, either by way of donations, or of higher annual subscriptions for the first three years.

Subscriptions may be sent to the Hon. Treasurer,

Mr. GEORGE MACMILLAN, St. Martin Street, Leicester Square, London,

or to the Hon. Secretary,
MRS. J. R. GREEN, 14, Kensington Square, London.

## British Medical Association.

THE CYPRUS SPHALANGÍ AND ITS CONNECTION WITH ANTHRAX.

(CALLED LOCALLY "SPHALANGI BITE.") By George A. Williamson, M.B., C.M.Aberd., Cyprus.

(Continued from p. 35.)

SYMPTOMS OF A TYPICAL SEVERE CASE OF "SPHALANGI BITE.

The patient, Aspasia Nicolaon, aged 50, was sent to me on September 22, 1899. On the night of September 18, while sleeping on a trestle bed placed against the wall in the yard of the house, she was wakened by feeling at the right temple a pain like the prick of a needle; she at once concluded that she had been bitten by a sphalangi, especially as there were many insects on the wall. On getting up in the morning she noticed a small pimple at the spot where she had felt the pain during the night—she was sure this pimple had not been there when she went to bed. Swelling rapidly set in, till both eyes became closed. The central eschar was very slightly raised, dark brown, and about the size of a sixpence, having a slight, clear odourless discharge. Ten small secondary vesicles were counted round the eschar: the sweller parts were industed, not "becare". the eschar; the swollen parts were indurated, not "boggy."

On microscopical examination of the discharge, large numbers of anthrax bacilli were discovered, as well as numerous

lymphocytes.

The treatment adopted was cauterisation by thermocautery, and the injection hypodermically at different spots round the eschar of a solution of mercuric chloride and potassium iodide in water.

The case went on to complete recovery.

#### Source of Infection.

The source of infection here appeared to be a sheep, which died of phlangari, and whose carcass had been thrown, a week before Aspasia Nicolaon took ill, into a field adjoining the yard of the house she occupied. Aspasia, a woman of loose morals, had not been engaged on any work, such as hide dressing, &c., by which infection might have been got.

#### REMARKS ON OTHER CASES.

Mehmed Ali Bilal was in hospital in July, 1899; he actually felt the sphalangi on his face, and the swelling, which began almost at once, became severe next day. It is interesting to learn that during the week preceding his illness two of his sheep died of "phlangari." Unfortunately he allowed eight days to elapse before he presented himself at hospital, so that Dr. Clareland (under whose care he was) had exact that Dr. Cleveland (under whose care he was) had great difficulties to contend with in the treatment, and the delay probably accounts for the severe ectropion and loss of sight from which he now suffers. He declined to have the ectropion operated on.

A similar case, ending in severe ectropion also, occurred at the same time in the same village, and was probably due to infection from the same carcass of sheep as in Mehmed's case; here, after some weeks' suffering, the patient recovered. She ascribed the disease to the bite of sphalangi sustained while she was sleeping in the open at night.

A few other cases came under my notice, but were not so

marked as the foregoing.

#### SIMPLE SPHALANGI STING.

Three cases where the persons were supposed to be bitten by sphalangi were also observed (in one of which the insect was actually picked off the face) where the resulting symptoms were slight, or, in other words, such as one would expect to find from the sting of an insect like the Mutille and in accordance with the zoological fact stated by Professor One of these cases is of sufficient interest to be

quoted—a woman came in a great state of fear, saying that she had been bitten by a sphalangi the night before, while collecting brushwood in her yard (the brushwood had no prickles); she said that she saw an insect like a sphalangi run off her hand after "biting" her, but, it being dusk at the time, she could not describe its appearance more accu-rately. On the back of the hand, a dark red spot about the size of a threepenny piece was distinctly evident and round this the hand year well as a state of the hand. this the hand was swollen and red up to the wrist; the arm was tightly bound with a piece of cord in the hope of stopping the spread of inflammation—on microscopical examination of the exudate no bacilli were to be discovered, and I ventured to tell her that, by applying carbolic fomentations, she would be well in a day or so, as, indeed, happened.

Reasoning on these cases the conclusion seemed justifiable that the sphalangi sting in itself is no serious matter, but if at the same time anthrax is inoculated the results may be very serious indeed, and perhaps a fatal issue may ensue.

#### DIAGNOSIS.

To distinguish between these two conditions (simple sting and inoculation of anthrax), a microscopical examination appears to enable one to come to an absolutely sure decision, as shown in the last-mentioned case, which had all the external appearances that one would expect to find about ten hours after the inoculation of anthrax by the sting.

#### Time when Sphalangi are found and "Sphalangi Disease" OCCURS.

Sphalangi are found and cases of sphalangi disease occur only during the hot months of the year, when also "phlangari" is most prevalent. This concurrence seems important as pointing to a connection between the three; and the fact that the sting has generally happened to persons while they have been sleeping in the open suggests the idea that their instinctively, before properly awake, trying to rub off the insect, whose movements on their face or other exposed parts they have felt, is regarded by the sphalangi as an attack, to be met by its only means of selfdefence—its sting.

#### Advantages Resulting from Identification of SPHALANGI, &c.

I venture to claim that the beneficial results from a clear recognition of the sphalangi and its power of causing inflammation and transferring diseases are the following:

(1) By the recognition of the anthrax bacillus in cases which are typically "sphalangi disease," it is now certain

that the disease is anthrax.

(2) Being sure, by the discovery of the anthrax bacillus, of the nature of the disease, the correct treatment may be at once begun.

(3) By the microscopical examination of the exudation at the seat of inoculation a certain diagnosis is without difficulty made.

(4) Greater certainty in prognosis is possible, the cause of disease being known.

(5) The certainty with which, in the absence of anthrax bacilli in a supposed case of "sphalangi disease," the patient may be told that no serious results will follow.

(6) The explosion of the idea, which caused so much fear amongst the people generally, that in Cyprus an insect existed having such a powerful poison in itself as that attributed to the sphalangi.

#### CONCLUSION.

In a few words, the explanation I offer of the nature of sphalangi disease is as follows:-The severe symptoms are due to anthrax which has been inoculated by the sphalangi's sting, or by the insect carrying on its body (probably on the fine hairs) anthrax infective material to an abraded surface, the sphalangi being a foul feeder, and carcasses of animals dying of "phlangari" (anthrax) being too often left exposed or buried without precautions being taken to prevent the spread of the disease.

SOME SUGGESTIONS FOR THE IMPROVEMENT OF SANITARY AND MEDICAL PRACTICE IN THE TROPICS.

#### By Ronald Ross, D.P.H., M.R.C.S.

Lecturer in Tropical Medicine, University College, Liverpool.

I PROPOSE to suggest in this brief paper some improvements in medical organisation in the tropics-improvements which have long been required, and which I think could very easily be made. Many of the points have already been mooted by Ernest Hart, Manson, and others; and most of them seem to be so obvious as scarcely to require lengthy comment. I recall them now in the hope that something

may shortly be done in the directions indicated.

1. Instruction in Animal Parasitology.—Several of the principal tropical diseases, malarial fever, dysentery, ankylostomiasis, elephantiasis, endemic hæmaturia, and others, are, or may be, caused by animal parasites; yet, in my experience, few medical men have made any particular study of such organisms. One does not often meet men who are quite familiar with the parasites of malaria, for instance. Few are able even to detect the presence of worms by the microscope. I once met a hospital assistant-a man who had recently received his diploma-who was in charge of a hospital full of cases of ankylostomiasis; he had never even heard of the disease, and was treating his cases for malarial cachexia! Even in our leading medical literature one often sees zoological names improperly written-a fault often committed, I fear by myself, amongst others. A knowledge of comparative parasitology is still more rare, leading many medical men to adopt a sceptical attitude toward ideas which have long been commonplaces among zoologists. Thus one controversialist refuses to believe that the Hæma-mæbidæ possess two cycles of development, because, he says, it is impossible for an organism to have two methods of propagation! The remedy is to give more attention to animal parasites in the ordinary pathological curriculum.

2. Instruction in Tropical Medicine.—I need not discuss

this question, which has already received much attention. I must point out, however, that it is not sufficient to instruct only those who have joined the medical services. Hundreds of medical men are called to serve as ships' doctors or as private practitioners in the tropics, or may be suddenly enlisted in our wars, as at present in South Africa. Special attention to tropical medicine should always be given in the

ordinary medical curiculum.

3. Special Questions in Examinations.—Such results are not likely to be fully attained until every examination paper on pathology and medicine contains at least one question on

animal parasitology and one in tropical medicine.

4. Literature.—In my experience it is generally very difficult to obtain in the tropics any literature except that which is contained in the most popular textbooks and periodicals. Application to booksellers at home for even the most important monographs is often a fruitless procedure and is always a slow one; while it is hard for medical men, especially for those who belong to the services-to drag about with them several hundredweight of books. no one can deny that the perusal of the leading medical literature is an absolute essential to medical proficiency. Small but up-to-date libraries should exist in all the leading towns in our tropical possessions, especially in connection with our principal Government hospitals. It is impossible to understand why such a want has not been attended to long ago. As an instance of the urgency of the want I may mention that I once found it impossible to obtain, even in the capital of India, a classical memoir on Anæba coli, which one would think should have been read by every medical man in the country. Perhaps it would be possible to arrange, through the Library of the British Medical Association, an agency for the supply of monographs to the tropics, either by loan or sale.

5. Microscopes.—It is also impossible to understand why the larger hospitals in the tropics are—or were a little

while ago-so seldom supplied with microscopes with oilimmersion lenses. There can be no doubt that every large hospital, and indeed, every medical man in the tropics, should have them. The smaller hospitals in localities where Ankylostoma duodenale abounds should possess instruments for the detection of the ova.

6. Other Apparatus.—Antitoxins, antivenene, and apparatus for bacteriological diagnosis, such as material for the Grünbaum-Widal test, should exist in the principal towns. Where such apparatus belongs to Government, it should be open for the use of private practitioners on payment. The same should hold in the case of Government medical libraries.

7. Medical Regulations.—These should be compiled and issued with the greatest care. It is impossible to conceive worse regulations than, for instance, those which held sway when I was in India. Ill-arranged, spread over many publications, confused, ill-worded, and often unintelligible—if not contradictory—they were the despair of most executive medical officers. They were, moreover, scarcely up to date from the scientific point of view.

8. Municipal Sanitary Regulations.—The same must be said of most municipal laws and regulations which I have studied—and I have studied many. They are also often ultra vires, or impracticable in the law courts. It seems to me that these regulations should be in the charge of a skilled central authority.

9. Organisation of Research.—If the medical profession wishes itself to be considered a scientific profession, it must ever maintain it to be its highest obligation to make strenuous organised efforts towards discovering the natural laws which govern the progress, propagation, and treatment of disease; it is not right for us to content ourselves merely with the efforts of a few private enthusiasts. The country confides in us to preserve it as much as possible from disease; if we do not, as a body, take the trouble even to ascertain the nature of disease, we shall end by losing that confidence—that is all. It cannot be said that in the past the profession has done all it should have done in this line-at least in regard to tropical diseases. The way in which The way in which the discoveries of Laveran and Manson have been neglected by us for years has become a by-word. Giles's work on the life-history of so important a parasite as the Ankylostoma duodenale, done many years ago, has not even yet received confirmation or rejection. Cunningham's important work on the life-history of Amaba coli and Cercomonas intestinalis seems to have been absolutely forgotten. Our public researches, even on such diseases as cholera, tropical typhoid, dysentery, and beri-beri, have been small indeed when compared with the havoc wrought by these maladies.

It seems to me that research can be organised in three ways: By the foundation of research laboratories, by the appointment of specialists to prosecute certain definite lines of investigation, and by the encouragement of private research. Though a great clamour for the foundation of research laboratories has arisen, and though I quite agree that bacteriological institutes should exist in all our principal colonies—if only for current executive pathological work—I think that this costly method is not likely to give the best results for the least money. Many such laboratories already exist without yielding much profit, while bricks and mortar, expensive appliances, and fixed appointments are not required for many important investigations. The second method-that of delegating certain researches to certain men-seems to me a better one; but even this method is somewhat costly, and is often likely to fail on account of the difficulty of selecting the suitable man. In my own humble opinion the best way of dealing with the subject is to encourage private research by large pecuniary rewards.

On the whole the man who has the best opportunities for

studying disease is the medical practitioner. In the tropics, especially in the medical services, numbers of men have the most admirable opportunities for research as well as abundance of leisure to prosecute it. Few attempt it, and the rest are blamed for their neglect. The blame is quite

unjust, because, as a matter of fact, scientific investigation is no part of a doctor's duty. We did not enter the medical profession for philanthropical purposes, but in order to make a living; we are not justifiably called upon to spend our leisure in laborious pursuits for nothing. Observation, clinical study, the study of treatment, indeed, are remunerative, as they ought to be; they bring advancement and often wealth by way of private practice. But it is otherwise with the laborious and highly specialised kind of investigations to which I refer. Although they are of the highest value to mankind, experience-such for instance as that of the great Vandyke Carter-shows that they generally bring no remuneration-at least, none which will compensate for the loss of money, time and opportunity which they often occasion. Under the present conditions it is impossible to recommend men who have to live by their profession to undertake such studies.

Of course many men will undertake such studies for nothing; but if we wish to stimulate a large number of men to undertake them we must make it worth their while. In my opinion the occasional donation of a prize of some thousands of pounds for really notable investigations is probably the best way—though it need not be the only way —to ensure rapid scientific advance in the profession. The money can be found if the proper effort be made, and I think that the British Medical Association is the most suitable body to undertake the task of considering the

matter.

10. A Central Scientific Authority .- I think that we have long felt the need of some strong central authority to encourage and support medical scientific research in the tropics, and to insist on those reforms in medical and sanitary practice which the progress of science continually demands. The instances already cited seem sufficient to establish the necessity for some force of this kind. Experience shows not only that investigation has not been adequate, but that even when important researches are made they are apt to be lost sight of, while the authority of individuals of the highest scientific distinction often fails for years to break down the inertia and scepticism which oppose new ideas. In matters of life and death, which medical science has to deal with, this sluggishness of thought and action is scarcely justifiable.

How a central authority of the kind I refer to is to be constituted I need not discuss at present. Perhaps we already possess the necessary organisation. The Royal College of Physicians and the Royal Society are already stirring in the matter of tropical medical science; we may hope that these and other societies will soon "force the

running" still more.

Dr. SARAT K. MULLICK (London) stated that there was urgent necessity for the appointment of specially trained investigators to fill the chairs in the medical schools of Until that was done the best interests of the schools would not be served, and there was little example or encouragement to students to take up special investigations.

Colonel Kenneth Macleod pointed out the difference between a teacher and one who devoted his attention principally to original investigations. Now and again an investigator was a good teacher but it was quite the exception, and the first essential to be sought for in one who held a lectureship was that he was a good teacher and exponent of the science and practice of medicine.

#### A DISCUSSION ON YAWS.

I.-Jonathan Hutchinson, F.R.C.S., LL.D., F.R.S. Consulting Surgeon to the London Hospital.

Mr. Hutchinson, who opened the discussion upon yaws, brought to the meeting a young man, an Englishman, from the West Coast of Africa, who he believed was the subject of yaws. The patient had been seen by medical men well acquainted with the disease in Western Africa, who had pronounced that he was suffering from yaws, and he had

also been seen by an old tropical practitioner in Liverpool shortly after he landed, who also agreed with the diagnosis. The patient, when stripped, presented a large number of scars and pigment-stained patches in his lower extremities, and also some less marked lesions on his forearms and wrists. Mr. Hutchinson stated his firm conviction that yaws is syphilis modified by race and climate. He considers that syphilis found its way into this country not from America but from the African coast. In fact, when traffic commenced between the West African coast and Western Europe syphilis appeared. In Fiji syphilis was unknown, but yaws prevails there most extensively. He considers this a strong argument in favour of his theory, as where the poison of yaws exists there it is impossible that the poison of syphilis can prevail, as the population is already protected by the fact of their having yaws. He knew his opinion was contrary to that of many who have carefully studied this disease, such as Sir William Kynsey, Dr. Daniels, Dr. Nicholls, and others. He had had many pictures and photographs of cases of yaws sent him from many parts of the world; but he drew opposite conclusions from these pictures to what those who sent them did. They were mostly sent to prove the diversity between yaws and syphilis; but in place of that, when pictures of cases of yaws and syphilis were placed side by side, the similarity of the two diseases seemed most striking, and these pictures, to his mind, confirmed his theory. Why yaws was not seen in England was because any European who contracted the disease in the tropics came back with syphilitic signs and symptoms. The granulomatous nature of many tropical ailments was most marked, and in the case of yaws, the granulomatous excrescences disappeared when a more temperate climate was reached. The idea that there was no primary sore in yaws he did not believe. Yaws was frequently contracted by a skin abrasion, and it was a common matter of clinical observation that many cases of blood poisoning occur without the development of any marked local sore or inflammatory area. When, however, in yaws an enlarged group of glands occurred, and careful search made for either a local sore or for signs of inflammation in the lymphatics leading towards the group of glands, he had little doubt then, in the early stages of the disease, a sore would be found. Mr. Hutchinson mentioned the case of a surgeon who pricked his finger doing a post-mortem examination on a case of yaws and developed typical syphilis when he came to this country. The tradition that the Fijians are liable to a peculiar liver disease; thickening, &c., seems to point to a syphilitic form of disease, and Mr. Hutchinson has no doubt that they are late and congenital effects of yaws. Sibbens in Scotland and the frambæsia that occurred in Cromwell's army in Scotland are no doubt examples of local outbreaks of yaws, that is syphilis misnamed or neglected. In Dublin a number of cases with raspberry-like eruption occurred in young men and one woman, and, although the eruption was styled frambæsia, it was cured by mercury.

## II.—E. DAVIES, M.D.

Dr. Davies said that he had seen yaws in Fiji and in Samoa, but that it always occurred in children, and he failed to see how sailors could become affected from children. Yaws was carried to Samoa by Fiji immigrants. Yaws did not exist in the Ellis group of Polynesian islands. He found calomel the best treatment for yaws.

# III.—Patrick Manson, M.D., C.M.G., LL.D., F.R.S. Physician to the Seamen's Hospital Society, Greenwich.

Dr. Manson thought that Mr. Hutchinson's views on the relation yaws bears to syphilis open to doubt. The case he had just shown rested for diagnosis on the opinion of others, and he thought Mr. Hutchinson was too credulous. Although the two diseases resemble each other in a few points that was no more conclusive as to their identity than was leprosy and tubercle identical diseases because the

bacilli of both agreed in many points. Inoculation by yaws will not protect against syphilis nor vice versā, and it is strange if the two diseases are identical that this should be so. If sailors get syphilis from females affected by yaws we ought to meet with transition stages of the disease in this country. Yaws, like many parasitic diseases peculiar to the tropics, could not be imported to colder climates, owing to the death of the parasite, owing to the absence of a continued high temperature.

#### IV.-D. C. REES, M.R.C.S., L.R.C.P.

Superintendent of the London School of Tropical Medicine.

Mr. D. C. Rees stated that he had seen many cases of syphilis and yaws in the hospitals at Cape Coast Castle. In the hinterland yaws were prevalent, but not syphilis, and the natives on the Coast looked upon syphilis as a new disease.

#### V.—KENNETH MACLEOD, M.A., M.D., LL.D.

Professor of Clinical and Military Medicine in the Army Medical School, Netley.

Colonel Macleob said the case exhibited by Mr. Hutchinson was undoubtedly one of syphilitic infection. Whether the lesions are tertiary manifestations of yaws, or whether syphilitic infection was admitted through the breach of surface caused by yaws, or otherwise contracted, is a question admitting of difference of opinion. Mr. Hutchinson has referred to a pigment ulceration of the genitals in Fiji as a tertiary syphilitic manifestation. If this is the same disease as I first observed and described in India some years ago, and by Dr. Daniels in British Guiana, I am of opinion that it is in no sense syphilitic. As regards a solitary initial lesion produced by inoculation this is not peculiar to yaws but occurs in other diseases—cow-pox and small-pox, for example—in which inoculated lesions are apt to be single, and the lesions resulting from natural infection multiple. When the micro-organism causing syphilis and frambæsia is discovered, and found to be identical or distinct, the question raised by Mr. Hutchinson will be finally settled, but meantime the issue presented by him must remain very debatable.

## Obitnary.

#### DR. WALTER MYERS.

It is with sincere regret that we have to record the death of Dr. Walter Myers, M.A., M.B., B.C. Cambridge, B.Sc.London. Dr. Myers was one of the members of the Yellow Fever Expedition sent out by the Liverpool School of Tropical Medicine, and at the early age of 28 has fallen a victim to the fell disease he went to Brazil to study. By his death science is robbed of one of its most promising investigators, and tropical medicine especially of an enthusiastic worker. Dr. Myer's brilliant career as a student in Cambridge and London was supplemented by more advanced studies in Freiburg and Berlin. His remarkable attainments led to his selection as one of the expedition to inquire into the nature and infectivity of yellow fever. His death adds another name to the list of medical men who have perished whilst unselfishly devoting themselves to the cause of suffering humanity and to the advancement of science. A truly heroic death, but one which leaves us, in this instance, poorer in resource, and less fit to contend with those scourges of the tropics which decimate our countrymen, and thwart the material and social advance of the natives of the less favoured parts of the earth.

## Mew foods.

#### BEEF PLASMON.

THE indefatigable Plasmon Company have produced yet another preparation, styled Beef Plasmon. It is stated to be pure albumen and pure beef-extract, and any one can test the amount of albumen in the preparation by applying the ordinary tests for albumen, after dissolving some of the Beef Plasmon in a test tube with water. The preparation is tasteless, and therefore not intended to be used without some flavouring, but even with table salt it is palatable enough. We welcome this endeavour to supply a pure albuminous and meat-extract food. We have been so accustomed to the rather pleasant "burnt" flavour of our meat preparations heretofore, that we are inclined to look askance at a tasteless compound. It must be remembered, however, that it is purity we want in our invalid dietary, and not merely "sweetmeat" preparations, and we trust to the Plasmon Company in their honest endeavour to supply pure foods for invalid consumption. Were the Plasmon Company to condescend to flavour their preparations no doubt they would attain a greater temporal and ephemeral success; but we hope the Company will never be deluded into these tricks to please the palate and cheat the digestion.

The Company give ample directions how to use the Beef Plasmon, and leave us in no doubt as to the limits of time the preparation will keep after the jar

is opened,

The preparation is so carefully put up that there is no likelihood of the Beef Plasmon being injured during a voyage; and we can therefore recommend, to all tropical residents and to medical practitioners in the tropics, this, the most recent and most efficient addition to our invalid dietary.

## Current Miterature.

#### BACTERIOLOGY.

FLEXNER ON THE ÆTIOLOGY OF TROPICAL DYSEN-TERY.—As the result of observations and bacteriological investigations on cases of dysentery which occurred amongst American soldiers in the Philippines, Flexner considers that tropical dysentery is of a bacillary and probably of an amoebic form. The method of investigation was by means of agar-plate cultures and the sub-culture of the colonies which developed in the agar. Bacillary colonies occurred regularly in the cultures made from the acute forms of the disease, and could be differentiated into two types. The bacilli of one type resembled the Bacillus coli in their properties, whilst the colonies of the other group closely agreed with those of the Bacillus typhosus. Pyogenic cocci were never absent.

In the bacilli which colonised like those of the Bacillus typhosus, although in average size they corresponded to the Bacillus coli, their length was incon-

stant, their mobility was moderate, and they did not stain by Gram's method, nor did they liquefy gelatin. A pale-brown raised growth took place on potato. lilac tinge was at first communicated to litmus milk, which in six or eight days afterwards, becoming alkaline, assumed a deep blue tint. On neither glucose

nor lactose was gas produced.

When tested with the blood serum of dysenteric patients, the organism gave usually a positive result. Guinea-pigs injected intraperitoneally died in from one to six days. In these animals the small intestines showed points of ecchymoses. Peyer's patches were frequently found congested, and the lumen of the intestine was occupied by a glutinous material. variety of the organism corresponds in all its properties with the bacillus found by Shiga in Japan to be present in all cases of "epidemic" dysentery. It may be asserted that when these bacilli are present, as in acute dysentery, the Amœba coli disappears, and again when the amœba is present, as in chronic dysentery, the bacilli in question is absent.

On the Agglutination of the Bacterium Coli. -Dr. C. Julius Rothberger has investigated the subject of the serum reaction in the group of coli associated under the name of Bacterium coli commune. The hope at one time entertained that bacteriology would serve to differentiate these bacteria has not been fulfilled. A number of investigations on this subject have been made, notably by Bensaude, Pfaunder, Smith, Wolf, Rodet, &c. Rodet states "that no two groups of the coli bacilli can be distinguished in which one exhibits a positive and the other a negative agglutination, but a gradual transition

Dr. Rothberger is of opinion that a mixed serum affords the best medium for investigation.—Zeitschrift für Hygiene und Infections Krankheit, May 23, 1900.

#### DYSENTERY.

FOR DYSENTERY.—The following prescription has been used with marked success in the Mandoli Regimental Hospital at Bhurtpore in cases of acute dysentery:-

R	Quinin. sulphat.				gr. ij.
	Pulv. ipecacuanha				gr. v.
	Ammon. chloridi				gr. x.
	Tr. opii				mxij.
	Aquæ, q. s			ad	3j.
M.	Sig. : To be given ev	ery four	r hours.		

-Ind. Med. Record, Dec. 26, 1900.

TREATMENT OF AMEBIC DYSENTERY.—The administration of medicated enemata is advocated by Aderhold. Several amœbacides are recommended to be employed on the enemata. Of these:—Sulphate of quinine, from 1 in 5,000 to 1 in 1,000 is advocated; or perchloride of mercury, from 1 in 10,000 to 1 in 5,000; or peroxide of hydrogen, 1 in 20 to 1 in 5; or a solution of methyl blue, from 1 per cent. to 10 per cent. The enema should be given once or twice daily as the patient lies on his back with the hips elevated. The medication of the enema may be varied from day to day.—Chicago Med. Record, Feb., 1900.

#### LEPROSY.

ORIGIN OF LEPROSY IN HAWAII .- The Journal of the American Medical Association says : - " The introduction of leprosy in Hawaii, from recent statements, seems to have been under the special protection of the native royalty and aristocracy. It first appeared in the person of a chief Kakauonohi, who had been to China, and from him was transmitted to another Naea, who was closely related to the reigning family. From the latter it quickly spread to his tenants and retainers, and for a considerable time was known among the natives as the 'ma'i alli,' or the chief's, The missionary physicians soon or royal, disease. learned to recognise it, and one of them, Dr. Dwight Baldwin, it is said, made a report on it, stating the facts of its origin, &c., and filed it with the Minister of the Interior; but it was held from publication, doubtless on account of the connection of royalty with the introduction of the disease. So long as the Hawaiian monarchy existed, segregation of lepers, though legally demanded, was very imperfectly carried out, owing, it is said, to the interference in high places. Since the overthrow of the monarchy, however, the measures have been more effective, and the seeing of lepers on the streets, which was formerly an occasional event, is no longer possible. The isolation law is an unpopular one with the native Hawaiians, who possibly regret the passing of the old régimé on that account as much as on many others. We have not seen this bit of medical history narrated elsewhere."

#### LIVER AILMENTS.

HEPATIC FORM OF TYPHOID FEVER .- Dr. H. Roger relates two cases of typhoid fever which presented a sudden fall of temperature, the one on the twelfth, the other on the fourteenth day of the disease, followed on the succeeding day by vomiting of a bilious character and a diarrhœa with stools of a yellowish-green colour. There was absence of meteorism, and no other indication of perforated intestine except progressive weakness, which ended fatally. At autopsy, the liver in both cases was found enormously enlarged, of a doughy consistence, and of a uniform reddish-yellow colour; on section the large vessels were seen to contain fluid blood, while the parenchyma was bloodless, homogeneous, and resembled fatty degeneration. Microscopic examination and chemical analysis confirmed this opinion. Experiments on dogs by injecting acetic acid into the common bile duct brought about a similar hypothermia with marked histologic changes in the liver. Dr. Roger concludes that a sudden sharp fall of temperature occurring at the time of the roseolar outbreak must find its explanation in the degeneration of the liver. This, together with a severe jaundice, bilious diarrhœa, and vomiting of bile, speaks for the clinical entity which the author describes as the hepatic form of typhoid fever.—New York Medical Journal.

#### MALARIA.

"Mosquitoes in Hong Kong." By Drs. J C. Thomson and T. M. Young, F.R.C.S.E.—In a Government report Drs. Thomson and Young report on the

collection of mosquitoes in Hong Hong. The area of the present investigation was in the Tai Pó district of what is called the new territory, that is, in the area of the strip of mainland lately ceded to Britain immediately opposite to the island of Hong Kong. The species obtained here is a larger one than that most common in Hong Kong, and we identify it as Anopheles Sinensis.

Drs. Thomson and Young recommended, to the Hong Kong Government, that a definite scheme should be initiated and acted upon for the complete eradication of the breeding-places of the anopheles mosquito, over a radius extending 250 yards from the particular police-station where their observations were made. They condemn mat sheds as dwelling places in a malarial district, owing to the cover they afford to mosquitoes.

A DIAGNOSTIC STAIN FOR THE PARASITE OF MALARIA.—Reinhold Ruge recommends the following:—

Dissolve and heat, and while the solution is boiling add methylene blue (pure medicinal Hochst) 5 grains. Let the solution cool and stand for forty-eight hours. Filter, and it is ready for use. On the blood-preparation drop a few drops of this stain, and wash them off at once; the preparation is stained a dull violet. The red cells are stained yellowish-green to bluishgreen; the annular parasites become blue-black; the larger forms of the parasite are coloured greyish-blue to dark blue; and the nuclei of the leucocytes take on an intensely blue stain. The stain is, however, only serviceable for preparations which are less than a month old. New or old preparations can be easily stained if a 1 per cent. solution of the methylene blue is used, with three grains of the carbonate of sodium in 100 cc.—Indian Medical Gazette, January, 1901.

THE CASTOR-OIL PLANT AND Mosquitoes.—The United States consul at Maracaibo, Mr. Plumacher, writes to the State department as follows concerning a remedy against mosquitoes, which, he says, "consists in planting the castor-oil plant (Ricinus communis or Palma christi) around the house and premises. In cold and temperate climates the castor-oil plant grows to a height of four or five feet; in these countries it becomes a tall tree, and is perennial. It seems that the smell of the plant is disagreeable to mosquitoes and other insects, and it is an acknowledged fact that where these plants grow few mosquitoes are found. Mr. Plumacher's personal experience bears this out.—
Med. Record, Jan. 12, 1901.

Exanthemata due to Quinine.—Kristian Grön states that in four cases, in which small doses of quinine where exhibited, erythemata with subsequent desquamation were observed; and in a fifth case a papular rash was seen, with a certain amount of urticaria. In all these cases itching and redness of the skin were marked, and a slight rise of temperature occurred in one case.—Norsk Magazin für Lagevidenskahen, Dec., 1900.

We are without information for what purposes

quinine was given, whether for purely experimental purposes or for the treatment of illness.]

WARRING AGAINST MOSQUITOES IN CUBA. - According to a despatch from Washington, Governor-General Wood has issued an order in Havana which declares that the chief surgeon of the department of Cuba has reported that it is now well established that malaria, yellow fever and filarial infection are transmitted by the bites of mosquitoes. The troops are enjoined to observe carefully two precautions; first, they are to use mosquito bars in all barracks, hospitals and on field service wherever practicable; second, they are to destroy the larvæ by the use of petroleum on the waters where they breed. Pools or puddles are to be filled up. To other collections of water is to be applied one ounce of kerosene to each fifteen square feet of surface twice a month. - Med. Record, Jan. 15, 1901.

NEITHER MALARIA NOR ANOPHELES IN BUFFALO, U.S.A.—In the Buffalo Med. Journal, November, 1900, Drs. Irving P. Lyon and Alfred B. Wright published their investigations as to the existence of authocthonous malaria in Buffalo and its environs, the result being that, in spite of their collection of mosquitoes, amounting to three hundred and seventy-four specimens, not one of these belonged to the genus anopheles, they were all examples of the culex. The authors likewise made blood examinations of 28 cases of suspected malaria, with negative results. The authors have therefore come to the conclusion that there is no evidence to prove the presence of malaria in recent years either in or around Buffalo.

Case of Æstivo-Autumnal Fever in New York.—Dr. George L. Peabody read a paper in a case of æstivo-autumnal fever at a meeting of the New York Practitioners' Society on December 7, 1900. The patient was a carpenter aged 34, who had lived in New York continuously for eleven years, during which period he had only once left the city, on which occasion he visited Pennsylvania for a few days. Crescents were found in the patient's blood. He was treated with quinine and arsenic with beneficial results. A marked feature in the condition of the patient was that the spleen, although felt to be enlarged during the illness, was perfectly immovable. This was no doubt due to a chronic perisplenitis. With the subsidence of the symptoms the spleen returned to normal dimensions and mobility.

Dr. A. G. CIPRIANI has found the following prescription very useful in the treatment of malarial fevers, malarial cachexia, and the other types of malarial disorders:—

R Eosolic quinine ... of each 7.5 grains.

Strychnine sulphate... of each 1.5 grain.

Arsenious acid ... of each 1.5 grain.

Extract gentian ... q. s. to make 50 pills.

Adults should take two pills three times a day at meals. Children from one to two pills a day, according to age.

Dr. Cipriani likewise found these pills efficacious in

chlorosis and anæmia. Eosolic quinine is the neutral quinine salt of trisulphoacetyl creosote.— Deutsche Medizinal-Zeitung, December 17, 1900.

QUININE Hæmoglobinuria.—Dr. A. G. Welsford is of opinion that hæmoglobinuria may be produced by several poisons, and quotes arseniuretted hydrogen, potassium chlorate, carbolic acid and quinine as being of the number. Dr. Welsford instances two very interesting cases of hæmoglobinuria, which he considers a very rare disease.

THE MAL-TREATMENT OF MALARIAL FEVERS .- Dr. B. M. Sircar, L.M.S., in the Indian Medical Gazette for December, 1900, draws attention to the evil consequences which are apt to follow the injurious practice of exhibiting quinine with an "empiric and heterogeneous combination of febrifuges, purgatives, hæmatics, bitter tonics, &c." "My long experience of malarial fevers in Bengal, extending over a period of nearly forty years, has convinced me of the undeniable fact, that much of the sufferings of the victims of malaria in villages is largely, if not wholly due, to the continued and indiscriminate use of these patent medicines, which in a manner augment and perpetuate the evils. Those who suffer most in this way are generally the poor and ignorant villagers living in rural districts. In their eagerness and anxiety to get rid of the fever, they buy a patent medicine which sells largely in the village, and after using it for three or four days, the fever subsides or altogether disappears, and they are delighted at the wonderful efficacy of the medicine, not knowing what baneful effects will subsequently follow from the poisonous action of iron and other contraindicated ingredients which they have swallowed along with the quinine, which has checked the fever.

#### PLAGUE.

PLAGUE IN VLADIVOSTOCK.—The reports of an outbreak of plague at Vladivostock are confirmed. There had been up to January 4 nineteen cases, of which fifteen were fatal. Owing to a recrudescence of plague at Smyrna, a quarantine has been imposed by Turkey and Greece on arrivals from that port.

Plague in South American.—The Government of Cape Colony have issued a proclamation that all the ports on the east coast of South America between the 10th and 40th parallels are infected with plague. It is high time that the condition of the South American ports on the east coast was seriously considered, for we have had many instances of infection in countries having trade relation with them. Unfortunately in the daily press and in the medical journals it was stated that it was the South African instead of the South American ports that were thus designated.

#### YELLOW FEVER.

YELLOW FEVER IN HAVANA.—In a recent half-yearly report of the Havana Sanitary Department it is stated that, during the latter half of 1900, no Americans had

contracted the disease. Some seventeen persons were under treatment on December 17, and it is interesting to note that they were all Spaniards who had recently arrived in Cuba.

ETIOLOGY OF YELLOW FEVER.—Walter Reed, James Carroll, A. Agramonte and Jesse W. Lazear, from their study of yellow fever, conclude that: (1) The blood taken during life from the general venous circulation, on various days of the disease, in eighteen cases of yellow fever, successively studied, has given negative results as regards the presence of bacillus icteroides. (2) Cultures taken from the blood and organs of eleven yellow fever cadavers have also proved negative as regards the presence of this bacillus. (3) Bacillus icteroides (Sanarelli) stands in no causative relation to yellow fever, but when present should be considered as a secondary invader in this disease. From the second part of their study, they conclude that: (4) The mosquito serves as the intermediate host for the parasite of yellow fever, and it is highly probable that the disease is only propagated through the bite of this insect.—Phil. Med. Jour.

#### MISCELLANEOUS.

CURE OF CONSUMPTION BY SPLENIC VIBRATIONS.—An osteopath in a Western State announced at a recent meeting of his bone-suffering brethren that he had devised a new method of curing tuberculosis, and presumably other bacterial diseases. The method consists in shaking the spleen so as to dislodge a number of phagocytes, which seize upon the specific bacilli and devour them. What the patient does, while his spleen is being vibrated, is not stated.—Medical Record, Jan. 12, 1901.

[Disbelievers in quinine may perhaps be inclined to try this novel expedient in malarial fevers.]

ALCOHOL IN FEVERS.—(1) If the tongue becomes dry, discontinue; if moister, the drug is doing good. (2) If the pulse becomes quicker, harm is being done, and the contrary if slower. (3) If the skin becomes moister, the antipyretic effect of alcohol is obtained, and again good is being done. (4) If the breathing becomes easier, continue the drug.—

Indian Medical Record, Dec. 19, 1900.

Antidote for Snake Poison.—Captain R. H Elliot, I.M.S., who has been carrying out a series of experiments with a view to discovering a proper antidote for snake-poison, delivered an instructive and interesting lecture on this subject a few days ago at Madras. Snakes, he said, manufactured their poison by their salivary glands—the glands which lie alongside the edge of their teeth; and but for the fortunate circumstance that all snakes are provided with a reservoir to secrete the poison, which is carried away down into their alimentary canal, every snake would be poisonous. Sea-snakes do not often bite, but if they did it would be fatal. The vegetable preparations put forward by the natives of this

country as antidotes are useless, as also is the injection of ammonia. The strychnine theory of Professor Muller has also been fully tried, and found to be a failure. The real antidote to snake-poison is antivenene, but unless it is fresh it is not satisfactory. The hope for the future lies in the serum of the snake—in separating from the snake itself the antidote to its own poison. In snake-poison itself, the lecturer added, there is not merely a lethal body, a body that kills, but it is more than possible that, side by side with it, or at all events separable from it by heat and chemical process, there is a remedy which would be compact and which will be found to be very powerful.—Indian Medical Record, Dec. 19, 1900.

A LARGE OVARIAN CYST.—In the British Medical Journal of January 19, 1901, Dr. T. H. Aquino, of the Gaduy Dispensary, India, gives details of a case of ovarian cyst in which some fourteen or fifteen gallons of fluid must have been present. The tumour had been growing for five years, and tapping was resorted to as the only means of obtaining relief, ovariotomy being out of the question.

DISEASES OF SAMOA.—Dr. Edward M. Blackwell, assistant surgeon U.S.N., discusses in the report of the surgeon-general, U.S.N., the diseases of the Samoan Islands. He says, concerning the maladies which attack the natives of the harbor of Pago-Pago, Tutuila Island, that "the most common of these are bronchial, rheumatic, neuralgic, and digestive troubles. The first three are probably due in great part to the fact that the natives get their clothes wet very often, and allow them to dry upon their bodies. Those who wear least clothes are generally least affected. The digestive troubles are probably due to the character and mode of preparing and eating their food, and to sedentary habits. Blindness in one eye is very common, and it is generally due to ophthalmia in childhood, which has been neglected. The cornea is opaque, and the lens generally bulges forward and adheres to it. As a rule, all the children have a peculiar eruption, which I have been unable to diagnose. It generally spreads over the whole body and limbs. It is macular, papular, vesicular, and pustular in the different stages, and often in the later stages there are large foul ulcers. natives think it is a necessary disease of childhood, and if it is late in making its appearance they sometimes inoculate the child with virus from the pustules of another child. There appears to be very little constitutional disturbance attendant upon it.

. . . A lady who lives at Faga-Toga has practised considerably among the natives and with very good results. She has had no medical education, except what she has picked up from a United States dispensatory, and from surgeons who have visited the harbour. She keeps the commoner drugs, and appears to understand their uses fairly well, and to prescribe them intelligently. I have seen several fractures she has reduced and treated with very good results. Two amputations that she has performed, one of the arm and one of the forearm, have come under my observation, and the results were

Treatment.

very good. She had native assistants, and the only instruments she had were a hand saw and a razor.—

Medical Record, Dec. 29, 1900.

OTOMYCOSIS IN THE TROPICS.—H. Campbell Highet believes otomycosis, or the growth of fungus in the external auditory meatus, to be rare in temperate climates. All the cases of the writer were in adult Europeans. Children are said to be exempt. The symptoms vary. There may be itching, pain, and discharge. In typical first attacks, the meatus is seen to be filled up with a soft wool-like substance. The disease is readily curable if carefully attended to. As much of the fungus as possible should be removed by a probe and the canals cleansed with warm bichloride of mercury solution. After the fungus has ceased to grow a powder is insufflated consisting of boric acid, bismuth salicylate, and oxide of zinc. The ear should be kept clean and dry as a prophylactic measure.—Medical Record, Jan. 5, 1901.

TREATMENT OF MOSQUITO BITES .- M. Manquat recommends for the treatment of the bite of the mosquito usually met with in France, the employment of tincture of iodine, formol, or mentholised eau de Cologne. Applying the tincture of iodine on a brush causes the disappearance of the itching at the end of about ten to twenty minutes. Although the iodine acts much more quickly when it is applied at once, still it does not lose its efficacy when the papules are enveloped and inflamed. Using formol, 5 grammes are taken of a 40 per cent. solution, and mixed with 10 grammes of 90 per cent. alcohol and 10 grammes of water. This is applied in a thin coat and renewed as it evaporates, being careful to discontinue on the appearance of any cauterising effect. This is said to act even more quickly than the iodine. Mentholised eau de Cologne or mentholised alcohol of a 4 or 5 per cent. solution, also soothe the itching. British and Colonial Druggist, January 25, 1901.

#### EXCHANGES.

Annali di Medicina Navale. Archiv. für Schiffs u. Tropen Hygiene. Archives de Medicine Navale. Archives Russes de Pathologie, de Medec., Clinique et de Bacteriologie. Australasian Medical Gazette. Boletin de Medicina Naval. Boston Medical and Surgical Journal. Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology. British Medical Journal. Climate. Clinical Journal. Clinical Review. Giornale Medico del R. Exercito. Hongkong Telegraph. Il Policlinico. Indian Engineering. Indian Medical Gazette. Indian Medical Record. Janus.

Journal of Balneology and Climatology. Journal of Laryngology and Otology. La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal. Medical Brief. Medical Missionary Journal. Medical Record. Merck's Archives. New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyclinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo. South African Medical Journal. The Hospital. The Medical and Surgical Review of Reviews.

The Northumberland and Durham Medical Journal.

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# The Journal of Tropical Medicine.

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In order to meet the constant enquiry for addresses of respectable firms catering for the various requirements so difficult to obtain abroad, we give a list of names and addresses which we trust will be found useful to our numerous correspondents and subscribers.

#### Original Communications.

#### PINTA.

By P. G. Edgar, M.B., C.M.

Acting Senior District Surgeon, Perak, Federated

Malay States.

The following case was for the past six weeks constantly under my observation. The details of the case are as follows: - Susannah Tamil, aged 35, married, has had no children, native of Southern India, complains that the skin all over her body is spotted with black and white patches. Soon after her birth her parents emigrated to Burmah. She resided in Rangoon until she was fifteen years old. For the last twenty years she has lived in Perak, Federated Malay States. Her parents are dead. The patient is the younger of two children. Her sister died of "fever" at the age of twenty. There have been no miscarriages. It appears her mother was quite well during her pregnancy, and, as far as I could elicit, she does not seem to have had an accident or fright during the period of gestation. Neither her parents nor her near relatives have, to the best of her recollection, been affected with a similar disease. She has always enjoyed excellent health. She has always had a comfortable home in Burmah and Perak and has been well fed, clothed and looked after. Menstruation commenced at the age of twelve and has been quite regular up to date. There does not appear to be any grounds to suppose that she has either inherited or acquired syphilis. The disease has already continued for thirty-four years, and shows no signs of abatement. The sequence of phenomena are as follows:—When she was about one year old a

single white spot appeared on the right shin. After a time secondary white spots became noticeable in the vicinity of the primitive one and also on the opposite Later on similar white spots made themselves visible on the arms, hands, chest, abdomen and back. Up to her first year, according to her mother, the colour of her skin was of an uniform dark tint. The head was the last part of her body to show signs of the disease; the white patch on her forehead appeared about three years ago. There was never, to the best of her recollection, any fever or pain associated with the appearance of the spots, which have, however, slowly increased in dimension in an executive fashion and gradually merged into one another. The patches have never been irritable. As far as she can remember she has not lost weight. She sleeps well, her appetite is good, and her bowels are regular.

Condition on Examination.—The patient is 5 feet 1 inch in height and weighs 117 lbs. She is a dark complexioned, healthy-looking, intelligent woman. Both buccal and conjunctival mucous membranes show no signs of anæmia. I cannot do better than quote Dr. Manson's words in describing her general appearance: "If extensive areas are involved the effect is often very grotesque, the unhappy victim looking like the painted clown of a circus." Her temperature is normal. There is nothing abnormal to be noted in the circulatory, respiratory, urinary and nervous systems. There is no evidence of lymphatic glandular enlargement. The thyroid body and spleen

appear also of normal size.

Integumentary System.—This system presents the most noteworthy changes. The skin, which is naturally dark coloured, is characterised, as will be seen from the photographs, by the association of excess with deficiency of pigmentation. Around the borders

of the leucodermic patches, which are characteristically scalloped, the black pigmentary deposit is most marked, while away from them the melanoderma fades into the normal dark tint of the skin. There is also to be seen in the normal areas of the skin minute melanodermatous spots presenting an appearance as if the skin had been tattooed; this is well seen on the posterior surfaces of both upper arms and in both infra-scapula regions (fig. 2); they do not fade on pressure. The hairs in the leucodermic areas have become white; this is well seen in the anterior and lateral surfaces of the legs (fig. 1). On the face (fig. 1) a white patch is visible on the forehead; it extends upwards and backwards into the scalp, a portion of which has become bald and the hairs have become grey. There are also numerous other leucodermic spots scattered all over the scalp. The mucous membrane of the lower lip shows two distinct white patches

A most interesting and, perhaps, exceptional feature in this case lies in the occurrence of the disease in the palms. If we direct our attention to figs. 1 and 2, but especially to the latter, we shall notice two leucodermic patches extending inwards on the skin situated over the muscles of the ball of the thumb, and another is distinctly visible in the palm of the left hand, just at the web between the middle and ring fingers. I wish to lay special stress on this point, as its appearance in the palm is unique. As far as I understand, it has never been observed before in the palm. "The palms of the hand and soles of the feet are not attacked" (Manson). "La maladie, jusqu'a présent, n'a jamais été observée à la plante des pieds et à la

paume des mains "(J. Brault).

The skin is somewhat dry but pliant, and emits a peculiar odour. It is scaly in the melanodermatous areas, but bona fide desquamation can hardly be said to occur in the leucodermic patches.

Cutaneous sensibility to pain, heat, touch and cold

is normal all over the body.

The action of the sweat glands is unaffected.

Pathology.—Scrapings were obtained from the skin, moistened with liquor potassae and examined under the microscope. On examining some of the scales with a high power a number of filaments were seen running in all directions. Some of them are of a uniform thickness, others show a tendency to taper at one end. As a rule they take a straight course, but some assume a sinuous direction. In many the threads appear as if they gave off branches, but I cannot be certain on this point. In between the filaments and at their extremities round or oval bodies can be seen. I presume the threads are the mycelial filaments, and the ovoid bodies are the spores of the fungus.

Toutes les variétés de carathés (another name for pinta) sont des aspergilloses de la peau. Il s'agit là, purement et simplement de maladies appartenant au groupe des dermatomycoses qui s'étends tous les En effet, dans les squames de l'épidermie malade on trouve non seulement un reticulum mycelien, mais encore ce mycelium porte des fructifications

très faciles à reconnaître (Brault).

With regard to its botanical position there appears to be a matter of doubt, for as Brault says 'l'étude des

carathés soulève également un problème de botanique; on ne s'entend pas encore d'une façon parfaite sur la détermination mycologique de ces espèces parasitaires, —d'après le professeur Van Thiegheur, ces espèces ne peuvent encore être rangées d'une façon definitive. Quelques uns de champignons offerent des caractères intermédiaires entre le groupe de Aspergillus et la groupe des Penicillum; d'autres, plus dégradés, se rapprocheraient du genre Monilia.' Diagnosis: Pinta may be distinguished from anæsthetic leprosy by the absence of anæsthesia in the patches; from scleroderma by the absence of rigidity, tension, shrinking and wrinkling of the skin; from ringworm and ichthyosis. Vide "Manson's Manual of Tropical Diseases," page 584, first edition.

Remarks.—This extremely interesting, if not absolutely unique case was brought to my notice about two months ago. It is an especially interesting case as it subserves the purpose of demonstrating the existence of pinta in the Old World. So far as I am aware no case has hitherto been reported or described as occurring in the Old World. I note, however, that in Manson's "Tropical Diseases," first edition, he states that "lately a similar disease has been seen in North Africa." The new edition of Manson's work I have not as yet seen. Brault in his recent work says that "la pinta est assez localisée comme domaine geographique elle ne se recontre en effet que dans le Nouveau Monde et plus specialement dans l'Amerique centrale : au Mexique dans la Colombie, au Peron."

Less typical cases of pinta than the one described here is not uncommon among the Malays, Chinese, and Tamils in Perak and the Straits Settlements. Among the Malays the disease is known under the name of "Sopah": it is fairly common in the Kuala Kangsar district, in Perak, occurring among several members of the same family. The Malays regard the disease as contagious; they declare it is not unusual for it to spread from husband to wife, or vice versa. Although they consider the affection communicable from man to man, they adopt no precautionary measures to prevent it spreading through a household. They appear to have no particular line of treatment for the disease. Manson says pinta is also known as the spotted sickness, mal de los pintos, tina, carathes carate, cute, cativi quirica.

I have thought the case worthy of notice for the

three following reasons:

(1) The very large extent of cutaneous surface involved.

(2) The existence of the disease in the Old World. (3) The extension of the disease into the palms.

In conclusion, I have much pleasure in expressing my obligations to Mr. R. P. Colomb, Apothecary, Ipoh Hospital, for his ready and kind assistance in helping me to obtain information about the early history of the case.

#### REFERENCES TO AUTHORS MENTIONED.

Manson, "Hygiene and Diseases of Warm Climates," edited by Andrew Davidson, 1893, also "Tropical Diseases," 1898.

J. Brault, Traité pratique des maladies des pays chaudes et tropicaux, 1900.

#### CRAW CRAW.

By R. A. BENNETT, M.B.Lond. Southern Nigeria Government Service.

CONSIDERABLE confusion exists as to the real position which this disease should occupy in dermatology, and it was in the hope of throwing some further light on the subject, that I carried out the investigations, the results of which are given below.

In the Lancet for February 20, 1875, there is a description of craw craw by Surgeon O'Neill, R.N., together with a note as to a filaria found in the papules, which he identified with the disease. Below is a short abstract of the paper. "The disease resembles extensive scabies in all its stages of development—papule, vesicle, and pustule; its common distribution is between the clefts of the fingers, on the front of the wrists, and the backs of the elbows; it is accompanied by intense itching. The papules arise singly and at irregular intervals, are firm to the touch, and in four days pass through the vesicular stage and become pustular; to relieve the itching, the patient scratches the part, and, doubtless, infects other regions in this manner. The disease has an incubation period of three days, is very contagious, and sulphur is powerless to check its course. Examination of the vesicle and pustule showed only pus cells, but on shaving off the base of the papilla, and with it the cutis vera, and teasing out the specimens in water, one or more filariæ were found. These filariæ measured  $\frac{1}{100}$  by  $\frac{1}{2000}$  inch, and had an abruptly pointed tail; at the blunt end or head were seen two small spots, whose significance could not be ascertained."

The name craw craw is given by the ordinary uneducated native of Old Calabar to practically all skin diseases, with the exception perhaps of yaws, which even he regards as distinct from the rest; the more intelligent native, however, divides craw craw into three classes: Leprosy, or bad craw craw; Tinea circinata, or Kroo boys' craw craw; and craw craw

Of 83 cases examined among soldiers, prisoners and the ordinary patients at the native hospital dispensary, I excluded 58 as being examples of ordinary tinea, leaving 25, which bore a close resemblance to the disease described by O'Neill, and which I believe are to be regarded as cases of craw craw proper.

The disease appears as a papule, which passes through a vesicular stage and becomes pustular in four or five days. The vesicles are characterised by a peculiar discharge, which stiffens linen and dries into yellow crusts, under which the pustules develop. There is some pain on pressure in the immediate neighbourhood of the lesions, but, owing to the colour of the skin, no line of hyperæmia can be made out. I have not noticed the intense itching mentioned by O'Neill, but this may perhaps be explained by the apathy displayed by the local negro, towards a condition which would cause the greatest inconvenience to a more sensitive individual. Still, a certain amount of irritation undoubtedly exists, which is allayed by scratching, and in this way the disease is assured of a continued course which may extend to weeks or months. The disease is markedly contagious and can

be easily inoculated, either upon another part of the patient's body, or upon a healthy individual. Incubation period two to four days.

The distribution of the eruption in my cases did not correspond with that mentioned by O'Neill, as may be seen from the following table:-

Inner side of the thigh 6 Back ... Buttocks ... 3 Hands and arms 11 ... 1 Legs 10 15

Presence of filariæ in the papules.—The blood of each patient was examined for filariæ, and the results agreed with the normal proportion of infected individuals in the district. Manson gives this as 63 per cent., and of my cases fourteen were infected—twelve with filaria perstans, and two with F. nocturna. On examination of the papules, however, the result was negative. In the pustules the ordinary cocci and pus cells were present in abundant quantity, but neither in pustules, vesicles, nor papules did I find filariæ or any trace of them.

It is easy, as Manson points out, to cause a slight hæmorrhage in removing the contents of the papules, and in infected individuals such blood will naturally contain filariæ; if, however, the operation is conducted with care, no hæmorrhage will occur, and the possibility of error is avoided.

Treatment.—This is simple as a rule, though in long standing cases some difficulty may be met It may be said that zinc and white precipiwith. tate ointments combined with reasonable cleanliness will affect a cure in most cases.

#### Conclusion.

In addition to O'Neill, two observers are usually quoted in connection with the disease-Silva Aranjo in 1877, and Neilly in 1882.

Aranjo describes a case in which this affection was associated with elephantiasis and chyluria. He discovered live filariæ (embryos) and one dead mature worm in the urine, but as he fails to mention whether he found filariæ in the skin lesions or not, his observations do not seem to bear on the subject in question.

It is difficult to understand the second case, that of Neilly, in Brest, where a boy who had never left France was found to be suffering from a skin affection resembling craw craw, in the lesions of which filariæ were found, similar to those described by O'Neill.

It is not impossible that in a seaport crowded with vessels from all parts of the world opportunities for filarial infection exist; and it may be that this case was infected in the ordinary manner, and that the filariæ found merely existed in the blood, which was accidentally tapped during the removal of the papule.

Be this as it may, I fail to see that the case for the filarial origin of craw craw has been proved, and, indeed, I think that the results of my cases tend to opposite conclusions. Further, it seems to me that craw craw is an unfortunate name and unworthy of a place in scientific phraseology. As I have mentioned, it is given by the natives to a great number of skin diseases; and I believe that even for medical

men it serves as a cover for a multitude of perfectly distinct affections.

The idea that craw craw should be regarded as a clinical entity, is probably due to the observations first made by O'Neill in 1875, but the disease is common enough, and had his conclusions been correct, they would surely have been confirmed before now, by one or other of the hundreds of medical men who have had opportunities of observing the affection during the past five and twenty years.

This has not been done, and I venture to suggest that craw craw as a specific name should be abandoned, and that the disease should be included in the class to which I believe it belongs, viz., pustular

eczema.

# CASE OF ACUTE CATARRHAL DYSENTERY WITH COMPLICATION OF SYNOVITIS OF KNEE.

By W. G. Ross, M.D. Seamen's Hospital, Royal Albert Docks.

August 11, 1900.—J. E., aged 20, a native of England, saloon steward, last voyage from Newport News, Virginia, U.S.A., was admitted, under Dr. Manson, at the Branch Seamen's Hospital, Albert Docks, suffering from acute dysentery. Had diarrhea for ten days; during the last four days noticed blood in his stools—had constant desire to go to stool and tenesmus. His cabin mate had died of dysentery

on the voyage.

From August 12th to 21st the patient had a temperature of 100 degrees. There were from forty to twenty stools daily, almost all consisting of blood, mucus and sloughs. All the conditions characteristic of acute dysentery were present. No amœbæ were found at any time in the stools. The disease began to abate after a course of ipecacuanha, the stools being reduced in number to five daily, all fæcal without blood or mucus; the temperature fell to normal, and salicylate of bismuth and morphia was administered on the 25th. On the 26th the temperature began to rise, and on the 28th was 100 · 6 degrees. The patient complained of pain in his right knee which, on examination, was found to be distended with fluid; the patella floated, and the normal outline of the joint was obliterated. There was no redness and not much tenderness on pressure, but pain on movement. The joint was slightly flexed. The temperature, pulse, and state of the tongue indicated an inflammatory condition of the knee-joint. bowels were more frequently moved, though there was no recurrence of dysentery at any time after the 21st. The leg was put upon a straight back splint with a foot-piece. On September 5th the temperature and pulse became normal, the tongue clean, the stools limited to two daily, and the knee reduced in size, though the patella still floated. On the 17th the splint was removed, the swelling was very slight, and there was no pain on movement. The patient was allowed to get out of bed on the 29th, and made a perfect recovery.

Remarks .- Brault and others have recently called

attention to arthritis as a complication or sequela of dysentery. The foregoing case appears to have been an example of this condition.

# PANI GHAO, OR SORE FOOT OF ASSAM, IN BRITISH HONDURAS.

By Osborne Browne, M.B. Assistant Colonial Surgeon, Gold Coast, West Africa.

In a letter to the Editors Dr. Browne draws attention to a similarity between what is termed the "ground itch" of British Honduras and the sore foot of Assam, described and illustrated in The Journal OF Tropical Medicine, for December, 1900. Dr.

Browne writes as follows:-

"I have read an article in the December number of the Journal on 'Pani Ghao, or Sore Foot of Assam,' and I have to state that it appears to me to be the same, only a worse form of a disease known as 'ground itch,' in British Honduras. This disease occurs in people who walk in mud, and is therefore commonest in wet season. It begins as an intense itching about the toes and between them, and sometimes on the sole or dorsum of the foot. This itching is most intense at night in bed. Then the toes and foot get swollen and red, and vesicles, preceded by papules, form, and much clear serum exudes from them. The condition lasts about a week. The treatment employed by the natives is to apply hot green plantain skins, or hot cloths; in fact, anything hot soothes the itching. Hot lotions are very grateful, but people affected rarely come under medical treatment. This appears to me to be a less severe form of pani ghao, as described in your December issue."

# THE ROYAL ARMY MEDICAL CORPS—THE REGIMENTAL SYSTEM.

(Communicated.)

That the Royal Army Medical Corps is very unpopular among the young graduates of our medical schools is a fact which hardly requires reiteration. Something is very radically wrong when we read repeatedly in newspapers that not a single civil surgeon in South Africa has accepted a proffered Queen's Commission in the Royal Army Medical Corps.

What, then, are the reasons for such a condition? Most R.A.M.C. men, when questioned on this matter, generally make some grumble about "pay," "leave," &c. None of these are, in the writer's opinion, at the

root of the matter.

The unpopularity of the R.A.M.C. dates back to the day when the Regimental Surgeon was abolished and the present Station Hospital System established. I know that the huge majority of present day R.A.M.C. officers simply croak if you breathe such opinions, but it is quite astonishing how many other people more or less connected with the Services agree with this explanation.

In peace times I do not think the Army is looked

after, medically speaking, as it ought to be. To bear out this I may explain shortly the present Station Hospital system. In a station where are garrisoned a cavalry, two infantry regiments and two or three batteries, there will be one Station Hospital into which these units daily dole their sick, higgledypiggledy. The men of different regiments are not kept apart. All the enteric cases are pushed into one ward—a, to my mind, radically wrong principle of treatment. Medical officers are doubtless detailed to the sanitary charge of the different regimental lines, but as for knowing the regiment—its officers and men—they know, as a rule, little or nothing. To my mind a medical officer is just as essential a part and parcel of a regiment as the adjutant.

To be able to treat and keep in health a body of men like a regiment properly, the doctor ought to live in the regimental lines—if unmarried with the other unmarried officers, in quarters. He should be thoroughly in the confidence of the officer commanding, of the adjutant, and of the sergeant major. He would in time get to know—and take an interest in—each individual man in the regiment, and moreover he would, I am sure, take an honest pride in not leaving a stone unturned by all means in his power,

in order to ensure the health of his regiment.

By getting to know the men, and by his communication with the executive officers, he would be able to recognise malingerers, bad characters, &c., not to speak of those who are constantly ill and whose chosen life does not agree with them. There would be plenty of practice, for with the women and children of the regiment he would have some 1,300 people under his charge.

But can the regimental system be reinstated? I say it can, and that too without interfering greatly with the present Station Hospital system, and without interfering with the existence of the R.A.M.C. as

a corps.

Every battalion of infantry and every regiment of cavalry should have at least two medical officers, and every battery—company of engineers, &c.—one. None of these medical officers should ever be above the rank of major. When a medical officer has reached the rank of lieut.-colonel—i.e., after twenty years' regimental service—he is fit for the administra-

tive grade, or ought to be.

Every regiment should have its small detention hospital, where the medical officers would see the daily sick, and detain and otherwise dispose of the men who come up. Serious cases of illness and those ill for longer periods than, say, thirty-six hours should be transferred to the Station Hospital. The wards there should be divided among the different regiments—thus we would have the "Devon" ward, the 5th Lancers ward, &c. After seeing his sick in the regimental lines the medical officer would proceed to the Station Hospital, and would there treat his own sick in his own ward, having the benefit of holding consultations on bad cases with his colleagues in other corps.

Every Station Hospital should have also a large and completely equipped laboratory, where every medical officer in the station had a bench, and where research work of every kind could be prosecuted. But

this is by the way.

The greater employment of soldier clerks is a very important matter for medical officers, who in these present days are over-burdened with reports and returns—all of which might be safely entrusted to superior clerks.

By allowing the above or more medical officers to units, there would never be any question of "no

leave" for study or other purposes.

Besides, in most cases, each regiment would have an unmarried medical officer living at and taking part in the duties of the officers' mess. I am quite certain that were a medical officer thus to live in every British regimental mess, there would be fewer young officers die of enteric than is the case at present.

It will be urged against all this that most medical officers could not afford to live in regiments. A regimental allowance—such as is in vogue in the Indian Army—should be given, and this in addition to the

present pay ought to be satisfactory.

I am quite sure that under some such a system as I have roughly sketched plenty of candidates could be obtained. Men would assuredly take a pride in their connection with army units. Personally—and I do not stand alone in this respect—I would far rather be junior surgeon to my county regiment than hold any position in the R.A.M.C. as at present constituted.

I have not referred to the Royal Army Medical Corps as a corps. For those who preferred and who have shown special qualifications for the instruction of men in field ambulance, a number of billets could

easily be set aside.

I am quite convinced that the reinstitution of the Regimental system on some such basis as I have indicated is the *only way* in which to popularise the medical services of our Army with the medical profession.

VINCIT QUI PATITUR.

PLAGUE IN THE CITY OF BOMBAY.—During the week ending February 12, 922 deaths from plague were reported in Bombay. This is the fifth epidemic of plague in Bombay since it first appeared in 1896; and owing to the later period at which the disease recurred this winter, it was hoped that the virulence of the outbreak was abating; this does not, however, seem to be the case. In the Bombay districts the disease is at present in abeyance. In the Mysore State plague continues to rage. In Calcutta the deaths from plague during the four weeks ending February 9th average between four and ten daily.

PLAGUE IN SOUTH AFRICA.—In Cape Town some thirteen cases of plague have occurred during the past fortnight; only one of the number attacked is a European. The disease is believed to have been imported from South America.

Pensoldt's Prescription for Pruritus Ani.— 30 parts. Sodii Hyposulph. ... ... 5 Acidi Carbolici ... 20 Glycerini ... ... 450 Aq. Distil. ... ... " To be applied as a compress.

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THE

## Journal of Tropical Medicine

FEBRUARY 15, 1901.

THE TEETH OF THE NATIVES ofTROPICS - ANAPPEAL FOR IN-FORMATION.

The question of our children's teeth in Europe and America is at present occupying so prominent a place in medico-dental circles, that one is induced to go further afield for information. The Teutonic and Latin races have so long lived in juxtaposition that the customs and habits of the two are known to each other and more or less practised in common by both. This is true in the matter of rearing infants, as in many other things, and as the food and general hygiene of the infant shapes the future physical development of the adult, we cannot expect radically diverse opinions or practices in this direction from a study of European peoples only. It is during the first two years of life that the physique of the individual is made or marred; and the

future of the teeth is likewise determined during that period. Many assume, that it is only when the teeth are through the gums that harm can come to them. The public largely assign the decay of teeth to eating sweets and many dentists to a microbic infection. The one is about as true, scientifically, as the other. No microbes will infect the tissue of a healthy tooth any more than they can thrive on other healthy tissues. It is weak or weakened organs that break down under and yield to infective processes and it is the badly nourished tooth during its process of growth and development which decays early. Our dentists concern themselves with the teeth only after they are decayed or misplaced, but the hygienic good to be done then is mere patchwork. As a people, we desire to know why our children fall so early into the dentist's hands; is it feeding? has it to do with food at all? is it habit of life? urbanising of the population, developmental retrocession, or what? Medical practitioners in the tropics (we have unfortunately, few qualified dentists there) can help forward this question. We know already that the teeth of the natives are not perfect, that they get toothache, &c.; we know even that wild animals in their native state suffer from toothache. Caries in teeth is nothing new in the history of mankind, nor even were the arts and mechanisms of the modern dentist unknown in Greek and Roman times. Do not let us mistake the point; the question is, why do the teeth of the children of the present day decay at so early an age? It is impossible to raise a healthy race on carious teeth, and unless the whole of mankind are in the same plight, the race whose teeth are good and whose digestion, and therefore physique, is the best, will surely obtain the mastery. There are therefore two or three questions to attend to. First, are the teeth of any of the more primitive races very good? if so, can a reason be assigned? Second, are any of the more primitive peoples afflicted with bad teeth? if so, can a reason be assigned? Third, at what age does decay commence? do the milk teeth decay? does the six-year-old (first) molar decay early, that is, between the seventh

and twelfth years? These are some of the lines on which information might be communicated.

Another pregnant question is the rearing of infants. In Western Europe and America the "unnatural" mother is quite a feature of modern civilisation. She not only insists upon limiting the number of her children, but in most instances refuses to suckle the children she has. Artificial feeding is therefore resorted to; bottles and infant foods are adopted, and the mother escapes the drudgery, as she regards it, of feeding her own child. This is nothing new; feeding-bottles, and therefore artificial food (for even cow's milk is artificial) were known and used in the time of the Romans, and the Etruscan feeding-bottle is a feature in our museums. But the Romans are no more; the Goths, untutored in the devices and tricks of civilisation, overcame them; and such will be the future for all races that cast aside Nature's methods and resort to artificial devices in dealing with the growth of population. The food of the infant and the means by which the food is administered, affect the structure of the teeth whilst yet they are beneath the gums.

On these points we can only hope to get information from primitive races, and we look to medical men in the tropics to relate their observations, and to help us to formulate a basis on which to work to prevent the physical (and therefore the mental) decline of the more civilised peoples.

## Translation.

#### THE MICROBE OF PLAGUE.

Distinction of the Bacillus of Yersin from that of Kitasato—Mistake in Kitasato's Investigations—Specificity of Yersin's Bacillus—Kitasato's Opinion on the Specificity of Yersin's Bacillus—Similarity of Kitasato's Bacillus to the Pneumococcus.

By Dr. Tatsusaburo Yabé. Chief Medical Officer to the Japanese Navy. (Translated from the French by P. Falcke.)

The epidemic of bubonic plague in Hong Kong in 1894 forms an epoch in our knowledge of the modern pathology of plague. The Japanese government commissioned Professor Kıtasato to make micro-biological investigations, and Professor Aoyama

to devote himself to the study of the clinical and anatomical-pathological aspects of the disease. Dr. Yersin was likewise sent to Hong Kong by order of the French Government for the same purpose.

The two bacteriologists, Kitasato and Yersin, each announced his discovery of a bacillus specific to plague; they were of different species, yet well nigh the entire medical world accepted them as one and the same bacillus under the name of "the bacillus of Kitasato-Yersin."

This acceptation of the respective microbes of Kitasato and Yersin as being the same, caused a certain confusion on account of the difference in the characteristics of two microbes, both described as the bacillus of plague. Other bacteriologists, who successively made investigations in Hong Kong, India, &c., did not deny the pathogenic action of Yersin's bacillus, but made no distinction between the bacilli of Yersin and Kitasato.

Dr. Kitasato stated that the plague bacillus could be stained by Gram's method, and that it coagulated milk, while Yersin's bacillus is not stainable by Gram's method and does not coagulate milk. Kitasato always found his bacillus in the blood of plague patients, but Yersin's bacillus is not found in the blood of sufferers with plague except in serious and septicæmic cases.

Aoyama, in the report of his studies on plague in Hong Kong, differentiates the two bacilli by observing that Yersin's, which is not stainable by Gram's method, predominates in the lymphatic ganglions, while the other one, Kitasato's, which is stainable by Gram's method, predominates in the blood. From this Aoyama concludes that Yersin's bacillus is the specific bacillus of plague, and that Kitasato's bacillus is not the real cause of the disease and is to be regarded as a species of streptococcus.

The investigations conducted on plague at Formosa by two military doctors, Okada and Mourakami, and by Drs. Ogata and Yamakiwa, entirely coincide with and confirm Dr. Yersin's discovery.

In 1896 Kitasato made a report on the plague bacillus, in defence of the specificity of his bacillus. In this report he states that he is convinced of the existence, both of his bacillus and of Yersin's in cases of plague. The microscopical appearance of the two bacilli is utterly different, his being smaller than Yersin's. The reaction of staining by Gram's method is the reverse; Kitasato's bacillus being stainable by this method. Yersin's does not cloud bouillon, and agglomerations cling to the side of the vessel while the liquid remains clear; in Kitasato's the bouillon becomes very opaque. Kitasato's bacillus is mobile, whereas the other is immobile. On gelatine Yersin's bacillus develops on the surface, while Kitasato's grows in the centre of the base. bacillus continues to develope on the surface of the gelatine, but Kitasato's stops growing after two or three days if kept in the incubator, and then dries up. It is anærobic and ærobic, while the other is ærobic only. In experiments on animals in the laboratory there is no great distinction. In the enlarged lymphatic glands of plague patients both bacilli exist, but Kitasato chose to isolate the microbe in the blood, being of opinion that several concomitant bacilli must exist in the glands, and that the specific bacillus exists in the blood in its pure state as in the septicæmia of mice and anthrax. Kıtasato has also isolated his bacillus from the liver, the spleen, the lungs, the heart, the brain, and the spinal marrow. He believed that plague is a purely septicæmic disease. Thus the bacilli discovered by Kıtasato and Yersin respectively are entirely different; they are positively not the same bacillus as is generally supposed, but Kıtasato denies that his bacillus belongs to a species of streptococcus as is the opinion of Aoyama. (See "Plague," by Drs. Kıtasato and Nakagawa in Stedman's Twentieth Century Practice of Modern Medical Science, vol. xv.)

In Japan, likewise, two different bacilli of plague are known, but in Europe only one is recognised—Yersin's—to which, however, the name of Kitasato is applied under the impression that they are the same. Although foreign investigators designate the plague bacillus "Kitasato-Yersin" without exactly knowing the character of Kitasato's bacillus, this name should be abandoned on account of Kitasato's mistake in his investigations in Hong Kong, for the microbe he found was quite different to Yersin's, and the specificity of Yersin's bacillus is acknowledged

and confirmed by all bacteriologists.

Kitasato persisted that his bacillus was the specific one until the epidemic of plague which broke out in Kobe in November, 1899. Cases were studied at this time by Kitasato himself and several Japanese bacteriologists. Thanks to these investigations, Kitasato acknowledged that Yersin's bacillus is the specific bacillus. In his last communication\* on the plague bacillus, he expresses himself as follows: "I also observed, when I made my investigations in Hong Kong, that there was a bacillus which was not stainable by Gram's method, but the cases which I examined were all septicemic ones, and I isolated my bacillus in the blood and lymphatic glands in the belief that the other microbes were secondary. However, in Kobe I had the opportunity of examining plague patients, and in each case I recognised the truth that the bacillus of Yersin was the specific In these cases the bacilli, which are not stainable by Gram's method, predominate in the lymphatics in a state of pure culture. In the septicæmic cases my bacillus is likewise present, and to me it appears as if it possessed a special influence in originating septicæmia.

Now the honour of the discovery of the plague bacillus must belong to Yersin alone, and we much regret that so distinguished a bacteriologist as Kitasato should have made so incredible an error in his search for the microbe. Unfortunately he considered plague to be a disease purely septicæmic, and he sought for the microbe mainly in the blood of plague patients who were already far advanced in the septicæmic stage (rather pneumococæmia?) whereas it is not a septicæmic disease, the ordinary type being

bubonic plague.

As the bacillus of Kitasato is not identical with that of Yersin, why did foreign scientists not find it in the plague-stricken? This is a question that

defies reply. Aoyama affirms that Kitasato's bacillus is a species of streptococcus, but this bacillus has a plainly visible capsule, and its lanceolate form and other characteristics do not coincide with those of the streptococcus. I have examined the bacillus of Kitasato in his laboratory at Tokio; it is a bacillus that is very similar to the pneumococcus. The coexistence of the latter in plague cases has been confirmed. One can therefore understand that Kitasato's bacillus coincides with the microbe designated pneumococcus by foreign scientists. The capsule, the staff-like form of Kitasato's bacillus, and its reaction to staining by Gram's method, indicates to us that it is a species of the bacillus of Tallamon Fraenkel, but which Kitasato formerly regarded as a new species of plague bacillus. This bacillus was often found in the blood of persons in Kobe suffering from plague.-From Archives de Medicine Navale, December, 1906.

## Malaria.

#### STUDIES IN RELATION TO MALARIA.

In The Journal of Hygiene, vol. i., No. 1, January, 1901, appears two all important articles to the student of Tropical Medicine. The first of these is concerned with "The Geographical Distribution of Anopheles in relation to the former Distribution of Ague in England," and the second is devoted to "The Structure and Biology of Anopheles." If these articles are a type of what we are to expect in the Journal of Hygiene, we have to thank the promoters of the periodical for affording a channel of publication to valuable and original work in a congenial setting.

Although ague in England has no immediate bearing on malaria in a tropical environment, still the methods of investigation, the style of argument, and the reasoning to a conclusion are so admirable and applicable that they may well be taken as a type for investigators in every climate. We can only give extracts from these important papers, but we hope the originals will be obtained and carefully studied.

#### PAPER I.

THE GEOGRAPHICAL DISTRIBUTION OF ANOPHELES IN RELATION TO THE FORMER DISTRIBUTION OF AGUE IN ENGLAND. By Geo. H. F. Nuttall, M.D.; L. Corbett, M.D., F.R.C.S., and T. Strangeways-Pigg, F.R.C.S.

General Observations upon the Geographical Distribution of Anopheles, and their Mode of Dissemination.

Members of the genus Anopheles are being found all over the world, and a number of observers are reporting their presence in malarious districts in various countries. In a monograph which will shortly appear from the pen of Mr. F. V. Theobald, some forty-two species or more will be described. Confining ourselves to the three species which are known to occur in England, we find that Anopheles maculi pennis is by far the most prevalent species in this country and in other parts of Europe, and

<sup>\*</sup> Report on Plague, December, 1899 (Journal Bacteriologicus Japonais).



Fig. 1,



Fig. 2.

# PINTA. Illustrating article by P. G. EDGAR, M.B., C.M.

		*

apparently in America. This species has been found in England, Scotland, Wales and Ireland. It has been found in Scandinavia (Zetterstedt), Germany (Meigen, Koch, and one of us), Austria (Schiner), Russia (Gimmerthal), Holland (van der Scheer), Denmark (Meinert), in many parts of Italy and the adjacent islands (Ficalbi, Grassi, &c.), as also in the United States (Howard, &c.), and Canada. Anopheles bifurcatus, which is less numerous, has been found in Great Britain, Lapland (Zetterstedt), Russia and Italy (Ficalbi), though it will probably be found elsewhere when searched for. Anopheles nigripes, which is the least frequent of these species, is found in Great Britain and Italy, and will doubtless be also found elsewhere.

### Methods of Investigation.

In collecting the larvæ of Anopheles we have found the following simple apparatus fully sufficient. (1) Some wide-mouthed bottles of medium size with cork stoppers; (2) a white enamelled dipper, which can when required be tied with a piece of twine to a light bamboo rod about four feet long; (3) a small pipette with a rubber bulb; (4) small vials containing dilute alcohol, which is subsequently concentrated, serve for the preservation of larvæ when it is not necessary to keep them alive; (5) the collector should be provided with labels, note-book and pencil.

On expeditions lasting a couple of days it is well to loosen the corks occasionally to give the insects fresh air. The use of the white dipper has the advantage of making it easy to quickly detect the eggs or larvæ upon the white background, the pipette being used for transferring them to the collecting bottles. Only rarely could larvæ be detected by direct inspection of the surface of the water, which in any case is very fatiguing.

#### Conclusions.

(1) The disappearance of ague from Great Britain does not depend upon the extinction of mosquitoes capable of harbouring the parasites of malaria.

(2) Three species of Anopheles (A. maculi pennis, A. bifurcatus, A. nigripes) are to be found in Great Britain in all districts which were formerly malarious, but also in places concerning which there is no record of the former prevalence of ague.

(3) The Anopheles to-day are most numerous in low-lying land containing many ditches, ponds and slowly flowing water, suitable for their habitat, and corresponding to the districts where ague was formerly prevalent.

(4) Since the disappearance of ague does not depend upon the extinction of Anopheles it is probably due

to several causes operating together:-

(a) A reduction in the number of these insects consequent upon drainage of the land, this being in accord with all the older authors who attributed the

disappearance of ague largely to this cause.

(b) Reduction of the population in infected districts as the result of emigration about the time when ague disappeared from England. This would naturally reduce the number of infected individuals and thus lessen the chance of the Anopheles becoming infected.

(r) It is possible that the use of quinine has reduced the chances of infecting the Anopheles through check-

ing the development of the parasites in the blood of subjects affected with ague.

Of these, the first-mentioned cause seems to have been chiefly operative. The possibility is not yet excluded of there being another intermediary host besides man capable of harbouring the parasite, and, assuming that this were so, this host may have become extinct in the lowlands where it is known that the fauna and flora have altered.

(5) The coincidence of the geographical distribution of ague and Anopheles as claimed by Grassi for Italy, and as probably holding good for other parts of the world, is hereby disproved for England, and consequently the generalisations are proved to be premature whereby he excludes other blood-sucking insects from being possible hosts of malarial parasites on the strength of this supposed geographical agree-

(6) Since the geographical distribution of Anopheles in England is wider than the former distribution of ague in this country, we are forced to conclude that it is not a matter of the geographical distribution of Anopheles as much as of their numerical distribution.

(7) Our observations having proved the existence of Anopheles in non-malarious districts, we believe that they will explain the occasional occurrence of ague in out of the way places, without making it necessary to assume that malaria-bearing mosquitoes have been freshly imported, for given suitable conditions of temperature and the requisite number of Anopheles, a malarious subject coming from other parts might well infect the local insects, which in turn would spread the infection to healthy persons.

(8) We would suggest to those engaged in the investigation of malaria in other countries to search as carefully for Anopheles in non-malarious as in malarious regions. More data as to the number of these insects in various localities are certainly required, though we are fully aware that numerical estimates permit of a considerable degree of error. Nevertheless they would always possess a relative

value.

#### PAPER II.

THE STRUCTURE AND BIOLOGY OF ANOPHELES (Anopheles maculipennis): THE EGG AND LARVA. By Geo. H. F. Nuttall, M.D., and A. E. Shipley,

The Ovum of Anopheles maculipennis.

When first deposited the eggs are white, but they soon darken. Each ovum measures 0.7 to 1.0 mm. in length, and is at its greatest breadth about 0.16 broad. The egg is boat-shaped and one end is slightly deeper and fuller than the other. The surface which, were the egg a boat, would be the upper is flattened but slightly convex. It is marked by minute reticulations. The under surface of the boat is characterised by much larger and more regular reticulations, which divide the surface into fairly equal hexagonal areas. The rim (a) of the boat is thickened and very regularly ribbed. Along the centre of each side, extending over a space of rather more than one-third the total length, this rim is much thickened, the ribbing is more marked and the whole forms a very conspicuous and characteristic feature of the egg. This thickening recalls the rounded float which runs along the edge of a life-boat. It serves the same purpose, being composed of air chambers, and is used to keep the boat-shaped egg with its flat surface uppermost. Howard (1900, p. 35) refers to the membrane we are about to describe as the "clasping membrane," notes the reticulated surface exhibited by the eggs, as also the presence of five to seven minute dark circular spots at the ends. His measurement of the egg is given as only 0.57 mm. As in other insects the egg doubtless varies in size.

The colour of the egg soon after it is laid is grayish black. If the eggs are subject to much attrition a delicate membrane splits off which gives the surface of the intact egg its reticulated appearance. Stripped of this membrane, which desquamates in irregular whitish fragments, the egg appears with a glistening black surface comparable to that of patent leather. One end of the egg is slightly blunter and more rounded than the other, and this contains the head end of the embryo. It is an interesting point that when the egg, as frequently happens, is drawn by capillary action a little way up from the water on to a leaf or some other half-submerged object, the head or blunt end always points downwards, and thus should the hatching take place whilst the egg is in this position the larva emerges into the water, and not into the air. We have observed that the eggs floating upon the water slightly indent the surface-film. .

The eggs are laid upon water suitable for the development of the larvæ, that is usually water rich in vegetable matter such as algæ. Grassi states that he first found eggs on February 15, 1899. In the spring A. maculipennis and A. pseudopictus lay their eggs in water about two feet deep, later when the weather grows warmer the eggs are laid in water but a few centimeters deep. On the other hand Grassi (October 4, 1899) says that A. bifurcatus lays eggs in cool weather by preference in shallow water, especially such as contains cress. Grassi only found larvæ in the end of March on the Pontine Marshes, their number increasing as summer advanced, whilst they were still encountered in September and October. In November his servant only found one larva of A. maculi pennis after two days' search in the Campagna.

On the second or third day after oviposition, this depending upon the temperature, the young larva leaves the egg and commences to swim in the water. The egg hatches by means of a circular split near the blunt end of the egg-capsule. This separates a cap-like anterior piece from the rest of the shell. There is no visible ring where the cap breaks off, but the cap is usually more or less of the same size.

## CAPTAIN ROGERS' RECENT INVESTIGATION ON MALARIA.

By Ronald Ross, Major, I.M.S. (Retd.). Liverpool.

An abstract of Captain Rogers' recent epidemiological investigations on malaria was published in the *Indian Medical Gazette* for September. It is certainly an interesting paper, though it can scarcely be said to yield reliable conclusions. Captain Rogers examined

the spleens of over 5,000 persons in the districts north of Calcutta and found that the percentage of persons with enlarged spleen was considerably smaller in the riverine villages than further inland, and was also much less in villages supplied with filtered drinking water than in the others. From this he concludes that there is "a very definite relationship between the drinking water and the amount of malaria, as judged by the spleen-rate in this alluvial area."

If these observations are confirmed by much more extensive investigations carried out in various parts of the world, they will tend to show that enlargement of the spleen is favoured by impure drinking water; but they will certainly not, by themselves, prove anything else. The mistake made by Captain Rogers is to suppose that the spleen-test is an accurate measure of the amount of malaria, pure and simple, in a locality. As a matter of fact enlargement of the spleen is a mere syndrome of malaria, which is largely affected by race, for instance, and possibly by other adventitious circumstances—such, let us say, as drink-Suppose for argument that this were actually the case, Rogers' conclusion would at once be vitiated. Can he show that it is not actually the case? In considering a question of such difficulty as that whether malaria is produced by other means than by mosquitoes, all possibilities must clearly be taken into account.

Consider some facts, for example. My regiment, the 19th M. I., at Secunderabad, suffered severely from fever in 1897. I used to spend the whole day in hospital studying the cases, and am quite certain of the fact. Yet, on an occasion when I was called upon to examine the spleens of the whole regiment for the purposes of an official report, I was astonished to find that, so far as I remember, not more than half a dozen of the men possessed enlarged spleens. I daresay the report can be still unearthed from the regimental archives-it was dated about August, 1897, I think. In this case then Captain Rogers with his spleen test would have declared the regiment free from malaria.1 Again, in the Wilberforce barracks at Freetown, Sierra Leone, we actually found parasites in a quarter of the men taken at random. Yet very few of them had enlarged spleen. Indeed in the whole of Freetown, which has a perfect pipe-water supply obtained from mountain sources, there is very little enlarged spleen, though the place is a deadly one. In short, Rogers' researches do nothing more than fall in with a suspicion which many of us have held, that this syndrome is due to something plus malaria. I would advise consulting Daniels' careful work on the subject. Then, again, it must always be remembered that the enlarged spleen is an evidence rather of past malaria in the patient than of present malaria-compare, for instance, my kala-azar report. Lastly, innumerable instances have shown in many parts of the world (for example Freetown, and towns in Italy—compare Bignami) that malaria is not given by drinking water.

Rogers further adduces the admission rates in local dispensaries in favour of his statistics. But surely no one can have faith in such evidence! The popularity of the dispenser—anything—will affect these rates.

The regiment drank unfiltered well-water.

As to comparing them with changes of season, he seems to forget that in localities when almost every one is infected from early childhood, the admissions may depend more on relapses due to wettings during sudden showers and similar causes than to fresh infections. Thus any military surgeon can observe that a route-march immediately brings on fever amongst a number of his soldiers! Does the route-march cause infection? The fact is that owing to the long-continued nature of a malarial infection, its numerous modifications and its relapses due to all kinds of causes, there is no disease in which statistics, epidemiological researches, ground-water estimates and so on are more likely to lead to error, and such are never very satisfactory methods of enquiry. To prove that malaria is carried by any other medium than by mosquitoes, the germs must be found in that medium; or the disease must be actually produced by it under experimental conditions; or both must be done. Nothing else is likely to satisfy experienced pathologists nowadays.

The true test of what Daniels calls the malariosity of a place is certainly not the spleen-test, but depends on the average length of time which elapses before an immigrant into the locality contracts the disease. I always warn men against undertaking medical researches; but since Captain Rogers shows so much enthusiasm in this cause he may permit me to suggest a modification which will probably make his investigations more useful. He should examine those commonest of immigrants, the local babies—as has been done with such effect by Koch, Christophers and Stephens (Royal Society Reports). He should compare the age of these at which the parasites begin to appear; the age at which they disappear; the corresponding enlargement of spleen; the percentage of local anopheles infected; and the conditions of environment. And, if I may make another suggestion, actuals rather than ratios should be given in his statistics, so as to enable the reader himself to judge regarding the value of each observation.

Rogers' finding anopheles larvæ in tanks and pools with fish in them is interesting. Evidence on the point is somewhat conflicting; and it is possible that the species of insects concerned may have to do with their habits in this respect. Rogers seems to think that I have laid it down as a law of universal application that anopheles never breed in tanks. If he will read my writings more closely he will find that in discussing the bionomics of gnats I have spoken from my own limited experiences only. In India my investigations were not exhaustive; while in Freetown there are hardly any large ponds with fish, and in these there were no larvæ. I know nothing of what

may happen in places where I have never been.

The habit of imputing to a writer opinions which he has never expressed and has indeed often disclaimed, and of then demonstrating simultaneously the folly of these opinions and of the writer for holding them, is one to be guarded against. I have really never expressed the "ingenious suggestions," which Captain Rogers seems to think I have, regarding the possibility of exterminating anopheles from, let us say, the whole of Bengal! The utmost I ventured to suggest was that it might be possible to exterminate them from

some large towns, cantonments, and plantations, under favourable conditions. So I think it is; but I have always expressly excluded large rural areas from this suggestion. The idea that vast tracts, peopled only with natives, can be freed from any mosquitoes is too silly to require even a disclaimer.

Indian Medical Gazette, Dec., 1900.

## A REPLY TO MAJOR ROSS'S CRITICISM. By Leonard Rogers, M.D., M.R.C.P., I.M.S.

Major Ross does not think the spleen rate is a good test of the amount of malaria; in which opinion he differs from many Indian authorities, such as Dempster, Chevers, Taylor, Dyson, &c., while the observations of the last two observers on the reduction of the spleen rate, as a result of measures to remove water logging produced by the Western Jumna Canal, strongly support their view. As, however, Major Ross admits the possibility of a connection between the spleen rate and impure water being an explanation of the facts I have recorded, the point is of purely theoretical importance, for repeated blood examinations have convinced me that there is a definite relationship between enlarged spleen and the malarial type of anæmia and general ill-health in malarious places, so that if an improved water-supply will remove these, its introduction will have a greater effect on the health of the population than any feasible crusade against the mosquito; and my results retain all their practical importance. Major Ross's regimental experience, which agrees with my own, only confirms the well-known fact that slight fever, which is immediately and efficiently treated, as will be the case in native troops, will much less frequently cause enlargement of the spleen, than repeated relapses or re-infections in the less favourably situated general population.

Major Ross goes on to deprecate comparisons of fever rates with meteorological data, on the ground that admissions may depend more on relapses than on fresh infections—a factor I have myself laid stress on. Here again it may be admitted that the results of such inquiries may be of more practical than theoretical value, for on account of the great difficulty of appreciably reducing new infections in a malarious tract of country by the destruction of the mosquitoes, a study of the conditions which predispose to the frequent and very injurious relapses is of all the more value as indicating the best times for successful prophylactic treatment; while they have the further advantage of being sufficiently simple to be profitably carried out even by such as myself, whom, Major Ross would "warn against undertaking medical

researches.'

It is to be regretted that Major Ross should have ended an otherwise very fair, if fatherly criticism, by incorrectly stating that I have misquoted his views. If he will read my paper a little more carefully he will see that I was fully aware of his admission, that it is impossible to exterminate the mosquito from large areas, for I wrote: "We may hope with Ross to at least rid towns or small areas of malaria," and again: "The importance of these observations lies in the

impossibility of destroying all the mosquitoes in even very small areas in Bengal, for the thirty tanks mentioned above all lay within an area of one-sixteenth of a square mile," being in fact a very small corner of Calcutta itself.

In kindly tendering me so much excellent advice Major Ross appears to have overlooked the fact that my orders were not to conduct a scientific investigation into the modes of infection in malaria, but to carry out a practical inquiry into the health of a considerable tract of country, while the results obtained still appear to me to strongly suggest, although they do not scientifically prove, that there is "a very definite relationship between the drinking water and the amount of malaria as judged by the spleen rate in this alluvial area." — Indian Medical Gazette, December, 1900.

## Rebiews.

Dr. B. Nocht. Uber Scorbut und Beri-Beri an Bord Hansa, 1900 (Scrofula and Beri-beri on Board Ship).—In a short but concise article the author, who, as Port Medical Officer, may be considered an authority, discusses the relatively frequent occurrence of many cases of beri-heri on board sailing vessels lately. The author, however, is of opinion that these cases relate not to beri-beri, but to scrofula, and founds his opinion on the following facts:—

(1) All persons affected recovered in a few days after receiving proper treatment and care, with the exception of those who had died on the voyage. In beri-beri convalescence and recovery are a matter of months, sometimes even years.

(2) Only one type of the so-called beri-beri was ever observed on board ship, viz., the dropsical or moist variety, characterised by weakness and swelling of the lower limbs, accompanied by hæmorrhages and swellings of the gums. The so-called "dry form" never came under notice.

These facts are remarkable, and certainly indicate "scrofula" as the diagnosis.

(3) It was only in Punta, Delgada, and Falmouth that the disease was diagnosed as beri-beri.

AN INTRODUCTION TO MATERIA MEDICA FOR INDIA. INCLUDING THE PREPARATIONS OF THE BRITISH PHARMACOPEIA, 1898. By C. F. Ponder, M.B., C.M., and D. Hooper, F.C.S., F.L.S. Calcutta: Thacker, Spink & Co. 1901. Pp. 356.

This carefully prepared work is destined to be adopted in the medical schools of India and to be in the hands of every practitioner of medicine, British or native, throughout India.

It is no mere compilation, but a systematic and thoughtfully arranged elucidation of Indian medicinal resources, whilst at the same time Pharmacopæial drugs are clearly set forth and described in a readable and easily understood form.

We are so apt to look askance at "native" remedies, and to regard the text-book we learned as students as a testament of therapeutics, that innovations are apt to be disregarded. One is wont to consider the

"British Pharmacopæia as good enough for me," and thereby turn a deaf ear to what the natives have to teach us. As the most distant parts of the world become better known to us, it would be wonderful, indeed, did we not have introduced to our notice new plants for medicinal purposes. Three hundred and fifty of the better known Indian drugs are introduced into this work; several natural orders, unheard of in British pharmacy, are mentioned and the properties of their plants described. Of these orders, Anonaceæ, Nymphœaceæ, Capparideæ, Anacardiaceæ, Passifloreæ, Acanthaceæ, Verbenaceæ, Amaryllideæ, are some of the more important. The action of these Indian non-official drugs is not confined to mere carminative, stomachie, tonic, or such simple virtues; but amongst them are purgatives, astringents, cardiac stimulants, nervine tonics and sedatives, insecticides, germicides, &c. It is noticeable that it is only amongst plants that natives of India search for medicine. No new native chemical drug is mentioned as having originated, in recent years at any rate, in India. Long experience has exploited the world of plants, and chemists have produced from inorganic materials the compounds with which we are familiar and which are being added to daily. The properties of plants has been made known to us chiefly by the dwellers in warm climates, whilst the action of chemical drugs has been enunciated chiefly by chemists. The east has given the one and western civilisation the other, and, as we are employing the chemists' productions in ever increasing numbers, let us not forget that Nature's laboratory has not yet been exhausted, and that the native dweller in warm climates may yet know of drugs as potent as opium and as useful as rhubarb. We commend this book to students of medicine in India; it is carefully and accurately written; it is well printed, handy, and the descriptions of the properties of drugs can be readily followed and understood.

## New Preparations, Drugs, &c.

Under the name of the Eigon Preparations, a new combination or compound of iodine has been produced in Germany by a Helfenberg firm. The preparations are albuminous compounds of iodine, containing up to 20 per cent. of iodine. The drug may be used as a powder for external application, being another of the many powders introduced to replace iodoform; or it may be given internally as a substitute for iodide of potassium, and for the same purpose. When given internally it is stated not to cause iodism.

CANDIDATES FOR INDIAN MEDICAL SERVICE AND THE R.A.M.C.—At the examination for entrance to these services now being held in London there are thirty-two candidates up for twenty-nine appointments in the Indian Service, and seven candidates for twenty-three places in the R.A.M.C.

## Correspondence.

To the Editors of the "Journal of Tropical Medicine."

SIR,—It is an excellent thing that any points connected with the relationship of malaria and mosquitoes should be fully discussed, as otherwise facts of easy explanation cause disbelief.

Sir Francis Winter is mistaken in thinking that places where malaria is common and mosquitoes are rare, have

been entirely neglected.

The Shire Highlands in Central Africa are a case in point. Malaria is moderately common, and yet more than half the residents informed me that there were no mosquitoes. Mosquitoes were not troublesome and very few people used nets, but they were there, and nearly all of them in one place, at least, were Anopheles, the genus which carries malaria. To one used to looking for them they or their larvæ were readily found. As a matter of fact, unless anopheles are fairly numerous they cause little inconvenience; two or three a night would not be noticed by people who were used to more numerous mosquitoes.

In considering the relation between the number of mosquitoes and the amount of malaria, unless the genus of mosquitoes is known, nothing can be said. In many places mosquitoes are more common in the less malarial places, but these mosquitoes are mainly, if not entirely, of a genus

and species which does not carry human malaria.

I am, Sirs, Yours, &c., C. W. Daniels.

London School of Tropical Medicine, February 2, 1901.

## Current Miterature.

#### DYSENTERY.

FOR DYSENTERY.—The following prescription has been used with marked success in the Mandoli Regimental Hospital at Bhurtpoore, in cases of acute dysentery:—

R Quinin. sulphat				gr. ij.
Pulv. ipecacuanha	ı			-
Ammon. chloridi				gr. x.
Tr. opii				mxij.
	•••		ad	3j.
M. Sig. To be given e	every	four ho	ars.	
-Medical Times and Hos	pital	Gazette	, Feb	. 9, 1901.

#### MALARIA.

METHYLENE BLUE IN MALARIA.—Dr. M. Dunn, of Louisiana, says that in the neighbourhood where he resides filthy ponds and water-holes are found in great abundance, mosquitoes without number make life unbearable, and malaria in its worst form reigns supreme. In the æstivo-autumnal type of malaria, treatment with quinine is generally attended with fatal results. Since he has commenced using methylene blue (medicinal) he considers it a God-send. He says: "There is no remedy yet discovered equal to methylene blue in cutting short malarial fever, and especially malarial hæmaturia; the fever leaves gradually in from seventeen to fifty hours." The author uses

Merck's brand of methylene blue, and is not afraid to use it freely. As a rule he gives a hypodermic of morphine and atropine half an hour prior to the methylene. His favourite formula for the latter is:—

For one capsule. For acute fevers, one capsule every three hours; in chronic forms, malarial, toxemia,

a capsule every four to six hours.

Occasionally the methylene blue irritates the kidneys, or causes nausea and vomiting. For the latter two conditions the author uses either cocaine in  $\frac{1}{10}$  gr. doses, or a combination of cocaine, cerium oxalate, and bismuth subnitrate, or benzoic acid or morphine.

KOCH ON MALARIA AND BLACKWATER FEVER .-Professor Koch has recently made some noteworthy pronouncements on the origin of malaria and the most efficient mode of treatment, which, albeit somewhat belated, will be listened to with great respect. He declared that he was convinced the mosquito acted as the intermediate host of the malarial-fever germ and that the only specific for that complaint was quinine. It is to be regretted, however, that in making this statement he seems to have quite ignored the researches and conclusions of the Italians, Bignami and Celli; and, above all, those of Manson and Ross. To a person who was unacquainted with the subject it would appear that Dr. Koch was propounding original However, it must be satisfactory to all concerned, and especially to Ross and Manson, that their work has received the seal of approval from so distinguished an investigator as the German scientist undoubtedly is. Another conclusion reached by Dr. Koch, that quinine is the cause of blackwater fever. has been received not only with scepticism by those physicians who have had experience in tropical diseases, but in the case of many with absolute disbelief. Dr. Manson said a short time ago that Koch's view of the quinine origin of blackwater fever was altogether untenable; that blackwater fever was an intense form of malaria was not borne out by factsthe infection was usually a mild one. He thought the idea that it was due to a special type of malaria parasite, possibly resulting from passing through a special form of mosquito, or that it was a disease sui generis as had been held, was not improbable. The Indian Medical Gazette of a recent date says that Dr. Nuttall. of Cambridge, some time ago sent to the editor of the Deutsche medicinische Wochenschrift, a criticism of Koch's which was refused publication in his absence. The Indian journal goes on to say that Professor Koch seems to be regarded in Germany as a sort of medical Kaiser whom to criticise is "lese majesté."-Medical Record, January 26, 1901.

#### PLAGUE.

In the Zeitschrift für Hygiene, vol. xxx., p. 359, F. describes a disease which occurs in East Siberia, in the Akscha district. Bacteriological observations are lacking, but the disease appears epidemically in

inhabitants of houses and tents, and simultaneously affects a marmot, the "Tarbagan" (Arctomys Bobac) in the dry summer and autumn seasons. The persons and animals affected exhibit buboes in the axillary and inguinal regions, and there is thus reason to come to the conclusion that the disease is plague. Dr. Frank Clemow, in the JOURNAL OF TROPICAL MEDICINE, February 1900, p. 169, wrote an article on the connection between the Tarbagan disease and plague.

SAPROL TO COMBAT MOSQUITOES.—The chemical manufactory of Flörsheim on the Main, has brought out a particular preparation of saprol with which to kill the larvæ of insects in pools, &c., by mechanically shutting off the supply of air from them. The price is reasonable, the preparation is free from tar products, but contains a certain quantity of eucalyptus, and

has an agreeable odour.

Hæmorrhages in Malaria — Dr. Lorenzo Bidoli describes a case of æstivo-autumnal fever of irregular character, and accompanied by hæmorrhages from the stomach and intestines. In view of the undetermined nature of blackwater fever, cases of this nature are interesting. The case reported by Dr. Bidoli recovered under systematic and vigorous dosing with quinine.

THE CLINICAL THERMOMETER AS A GERM CARRIER.-W. J. Conklin sounds a note of warning as to the danger of conveying infection by means of the thermometer. Assuming that the thermometer as well as the scalpel may be a germ carrier, does not the mouth furnish as favourable a medium for the development and growth of bacteria as the open wound? It has been asserted that the ordinary methods of cleaning a thermometer, such, for example, as holding it under the water tap, or wiping it with a damp cloth, are sufficient to rid it of bacteria. From careful measurements he estimates that a degree mark is wide enough to accommodate 100 tubercle bacilli, marching in single file, so to speak. Also, that an area with the length and breadth of one of these marks would furnish room for the lodgement of 280,000 tubercle bacilli. Believing that a clinical thermometer should at all times be sterile, he has for some months carried his thermometer in an ordinary rubber case, filled with a 1 to 500 or 1 to 250 bichloride solution. All that has been necessary to prevent leakage of the solution was a piece of leather packing, but there was gradual shrinkage in amount, as each time the thermometer was withdrawn from the case a small portion of the solution adhered to it, and he found it necessary on this account to renew the solution once in three or four days. It was his custom to rinse the thermometer in a glass of water or under the tap before and after using it. While experimenting for the purpose of proving that a thermometer cleaned in the ordinary way was not necessarily sterile, he had at the same time sought for proof that a thermometer kept constantly immersed in a strong bichloride solution, as described above, was entirely free from micro-organisms. The results of the bacteriological examination of six thermometers by Professor Dodge were as follows: Four had been washed but not sterilised. Micro-organisms of one or another variety were found on each of the four. Two had been washed and then placed in a case containing bichloride solution. No micro-organisms were found in either. Conklin thinks these experiments furnish conclusive proof that the thermometer may be a germ carrier, if cleaned in the ordinary way; that by means of a very simple and inexpensive device it may be rendered sterile after each use.—Buf. Med. Jour.

PRESERVING RUBBER ARTICLES.—Professor Krolikowski has, according to Merck's Report, come to the conclusion that the best preservative of rubber materials is to place them in 1 per cent. solution of formaldehyde or chloride of zinc; a concentrated solution of boric acid has also given good results in this direction.

THE JUICES OF LIMES AND LEMONS AS GERMICIDES. -According to the Indian Planters' Gazette the juice of limes and lemons are so potent as germicides that by squeezing the juice of one lime or lemon into a glass of water, well nigh irrespective of source, and which has been neither boiled nor filtered, the water after ten or fifteen minutes is thoroughly disinfected. Experiments with cholera germs in water have been tried, and it is stated that the juices of these fruits are as deadly to cholera germs as the most potent of our chemical disinfectants. This is a most important statement, and one which well deserves careful scientific enquiry, and it may serve to explain the wide use made by the natives, of the lime in many tropical countries. During the cholera mission to Egypt in 1883, several of the medical men, who were sent out from this country, believed that "lemon squash" made really from the fresh limes (not lemons) did good in warding off cholera from themselves. If fruit acids have a potent germicide action, especially against cholera, it is altogether wrong to prohibit the sale of sound fruit in native bazaars, as is so often done.

During the siege of Delhi in 1857, cholera was prevalent amongst the British troops, and fruit was forbidden the camp. Many officers, however, disobeyed the order, and ate freely of every kind of sound fruit they could find, with the result that according to the statements of these officers, the fruit eaters escaped cholera in a larger ratio than those who abstained from it. The question ought to be thoroughly investigated.

#### YELLOW FEYER.

THE DESTRUCTION OF MOSQUITOES IN HAVANA.—So convinced are the sanitary authorities in Havana of the potency of mosquitoes in spreading yellow fever, that they have appointed some forty sanitary inspectors to deal with the possible breeding pools of mosquitoes in the neighbourhood of the city. Pools which cannot be drained have petroleum poured on to them in order to kill the mosquito larvæ. In houses in which yellow fever exists an attempt is to be made to kill the mosquitoes, so as to prevent them carrying away infection and inoculating other people.

Mosquitoes and Yellow Fever.—A despatch to The Sun from Havana states that a number of inoculation experiments have been made at Marianao, the subjects being American soldiers who voluntarily took the risks involved. Four cases are now under treatment, the patients all being soldiers who were bitten by mosquitoes which had previously bitten persons

suffering with yellow fever. The committee engaged in conducting the experiments has found that a mosquito, after having bitten a person affected by the disease, needs fifteen days before it is able to transmit it. If it bites a non-immune in less than that time he will not develope the disease. The four cases under treatment developed the fever in about three days after being bitten. Five soldiers have been living and sleeping in infected clothes, beds, and bed-clothes for twenty days and have not developed any symptoms.—Medical Record, January, 1901.

#### MISCELLANEOUS.

JAPANESE AMBULANCE ARRANGEMENTS .- A correspondent with the Pekin Relief Column has given valuable information concerning the Japanese ambulance arrangements. In the action at Pei-Tsang the Japanese bore the brunt of the chief attack, and lost somewhat heavily, which afforded the writer "an opportunity of watching the work of their medical department, their methods deserving the highest praise. The wounded were rapidly brought to the dressing stations in ordinary stretchers, and laid upon waterproof sheets. Their wounds were attended to, nourishment was given them, and they were quickly transferred to a temporary hospital established in a house near the river bank, from which they subsequently taken by boat to Tientsin." The Japanese are undoubtedly a great and rapidly progressive people. They have assimilated all the advantages of the Western civilisation with few of its disadvantages. There is no reason nowadays why the wounded should not be adequately attended to on the field, and the sick taken efficient care of in a campaign. It is largely a question of transport, but as long as the absurdities of red tape prevail, and stores, for example, are allowed to rot upon the quay merely for want of the signature of some particular person authorising their removal; so long as our army is ruled by civilian heads which are hopelessly wooden, so long will procrastination and inefficiency be the rule in the medical department. The Japanese have learnt from us; it now seems that we might with much advantage learn from them. Napoleon once said that the British Army was an army of lions led by jackasses. To repeat this now, would be unfair to the many brave and capable officers who have done much good work in South Africa, but the saying might be paraphrased with especial reference to Pall Mall. — The Medical Times and Hospital Gazette, February 2, 1901.

A Case of Paroxysmal Hæmoglobinuria.—W. J. Lamson reports the case. The patient was a man, American, aged 40, who had lived as a child in South America, but had subsequently lived in New York. One day, after a long drive in the cold and being thoroughly chilled, he passed urine deeply coloured with blood. Thereafter he had similar attacks at irregular intervals, and they have continued till the present time, a period of some eight years, always referable apparently to exposure to cold. A typical attack begins about 10 a.m., with a chilly feeling, often

becoming a rigor; cold extremities and cyanosis of fingers, nose, and ears; increase in jaundiced hue, and nausea. He then passes urine of port-wine colour, somewhat more frequently than normally and in greater amount. The chill lasts from one-half to three hours and is succeeded by a feverish sensation. At times an urticarial eruption appears on the dorsum of the hands or on the right cheek; or he may have tender painful areas over the bridge of the nose, around the right orbit, or in the left groin. Normal urine is passed again, sometimes in twenty minutes, often not for several hours, depending on how quickly he becomes thoroughly warm. Between the attacks he feels perfectly well, but is a little anæmic. The blood shows no plasmodia. The urine is normal. There is a double murmur at the base of the heart. No remedial measures have been of any special service. The author gives a general description of the malady, and considers the best therapy to be removal to a climate where the temperature is mild and equable.—New York Medical Journal, January 19, 1901.

VENOMOUS SNAKES, THEIR BITES, AND HOW TO TREAT THEM.—Dr. Joseph McFarland, in the International Medical Magazine, writes a bright and practical article on "Venomous Snakes, their Bites, and how to treat them." He advises that first of all the circulation of the bitten limb should be at once interrupted in order to prevent the toxin being absorbed into the system. The next step should be free incision and enlargement of the wounds caused by the bite of the snake and vigorous suction to draw out the poison, followed by: "Hypodermic injection of three to six drops of a fresh ten per cent. watery solution of chloride of calcium into about a dozen different areas about the wound." Subsequently hypodermic injections of strychnine should be given to stimulate respiration, and hypodermic injections of Calmette's anti-venene (antivenous serum) should be administered very frequently in doses of from 10 to 20 cc. The lastmentioned remedy is the most urgent, and the author furthermore advises all those whose occupations and travels render them liable to danger from this source, always to carry with them a quantity of snake-venom anti-toxin.

False Ipecacuanha.—Practitioners in the tropics would do well to see that they are using, or that their druggist is supplying them with genuine ipecacuanha. It seems that in addition to the text book notifications of possible adulterations, The British and Colonial Druggist, February 1, 1901, states that during January, 1901, a number of balls described as "roots" was being exposed at auction along with the genuine root of the Cephaëlis ipecacuanha. The roots of the genuine and unofficial plants bear a marked resemblance, the most pronounced difference being the large amount of hair-like rootlets present in the spurious article. The "roots" in question seem to be derived from the Richardsonia scabra, a plant which is said to contain no emetine. This may be in itself an advantage; and therapeutists have been advocating ipecacuanha with the emetine removed during recent years. But the spurious root may be deficient in more important elements than emetine and if this is so, and spurious

plants or the non-genuine ipecacuanha is administered, the absence of any remedial action of so-called "ipecacuanha" in many cases of dysentery may be explained.

BLACKWATER FEVER IN PORTUGUESE CENTRAL WEST Africa.—Dr. A. Yale Massey, in a letter to the Editor, dated October 22, 1900, mentions that he has met with six cases of blackwater fever at Chisamka, Angola, in Portuguese West Central Africa. Dr. Massey states that he is located 300 miles from the African West Coast, and 400 miles south of the Congo, and as this is a new field of exploitation the observation is of interest. Dr. Massey also states that he has met with the ova of the Bilharzia hæmatobia.

FOR VOMITING AFTER CHLOROFORM (from Clinica Moderna) :-

Cerii Oxalat. .. R 2 grains. Codeia Sulp. ...  $\frac{1}{5}$  grain. 1 grain. Calomel

#### Letters, Communications, &c., have been received from :-

A.—Mr. J. Ashton (Ilford).

B.—Dr. R. A. Bennett (Old Calabar); Dr. Osborne Browne (Gold Coast); Lieut. Biggam, R.A.M.C. (Stranraer).

C.—Major S. F. Clark, R.A.M.C. (Hong Kong). D.—Dr. C. W. Daniels (London).

H .- Dr. John Howard (London).

L.—Dr. Henry Layng (Swatow).

M.—Dr. W. A. Mackay (Huelva); Mr. J. Maxwell London); Dr. P. Manson, C.M.G. (London). P.—Dr. G. W. Paterson (Grenada); Dr. H. Campbell

Perkins (Travancore); Dr. Ronald Ross (Liverpool).

R.-Dr. W. G. Ross (London). S.—Dr. W. G. Ross (London).
S.—Dr. R. A. Shekleton (Dublin); Dr. Henry Strachan (Brockley); Dr. H. Soltau (London).
T.—Dr. J. C. Thomson (Hong Kong); Dr. S. W. Thompstone (Newcastle).

Annali di Medicina Navale.

Z.-Dr. H. Ziemann (Wilhelmshaven).

#### EXCHANGES.

Archiv. für Schiffs u. Tropen Hygiene. Archives de Medicine Navale. Archives Russes de Pathologie, de Medec., Clinique et de Bacteriologie. Australasian Medical Gazette. Boletin de Medicina Naval. Boston Medical and Surgical Journal. Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology. British Medical Journal. Climate. Clinical Journal. Clinical Review. Giornale Medico del R. Exercito. Hongkong Telegraph. Il Policlinico. Indian Engineering. Indian Medical Gazette. Indian Medical Record.

Janus. Journal of Balneology and Climatology. Journal of Laryngology and Otology. La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal. Medical Brief. Medical Missionary Journal. Medical Record. Merck's Archives. New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyelinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo. South African Medical Journal. The Hospital. The Medical and Surgical Review of Reviews. The Northumberland and Durham Medical Journal. Treatment.

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- 1.—All communications will be acknowledged in the JOURNAL under the heading "Letters and Communications Received." Contributors who do not see their names in the list should communicate forthwith with the Editors or Secretary.
  - 2.—Manuscripts sent in cannot be returned.
- 3.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
- 4.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.
- 5.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Editors.
- 6.—Correspondents should look for replies under the heading "Answers to Correspondents."

## The Journal of Tropical Medicine.

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## Original Communications.

#### OPHTHALMIC NOTES FROM THE TROPICS.

By H. CAMPBELL HIGHET, C.M., M.D., D.P.H. Physician to the Royal Palace, Bankok, Siam.

To those medical men who see much eye disease in the tropics, one of the most interesting features of the Journal of Tropical Medicine is the attention paid to this subject by Surgeon-Major Yarr and others. Much has already been written on the diseases to which the eye is specially liable in warm climates, but there is still a wide field for research and great need for additional information on many points. With the view of assisting in a slight way in this work, the following notes have been compiled from a record of cases of general diseases of the eyes and appendages seen in private practice either in Singapore or Bankok.

Starting with diseases of the conjunctiva, nothing special need be noted with regard to the ordinary catarrhal conditions, except that they are more frequent at the change of the monsoons and occur equally in all nationalities. Acute catarrhal and acute granular ophthalmia often seem to take a widely spread epidemic character in Siam. Thirty-nine cases of granular ophthalmia were specially noted, the incidence amongst the various nationalities being, Chinese 22, Malays 7, Eurasians 3, Europeans 2, Arabs 2, Jews 1, and others not specified 2. All the usual methods of treatment were tried with varying success and in some of the more obstinate cases excision of the upper palpebral fold, scarification of the granules or expression of their contents with forceps and subsequent application

of sulphate of copper in crystal and even division of the outer canthus, had to be resorted to.

Acute purulent ophthalmia, especially the gonorrheal form, is fairly common amongst the Chinese. In many of these cases the rapidity of the destructive process is truly appaling. In my hands the most effectual treatment in such cases is as follows: the eyebrows, eyelids and conjunctival sacs are thoroughly disinfected with a solution of bichloride of mercury (1 in 5,000). Great care is taken to clear out any collection of discharge from underneath the lids. This is done by means of a douche and a blunt, flat pointed glass canula. A few drops of a solution of nitrate of silver (gr. x.—3i.) are then dropped into the conjunctival sac, the eyelids are closed, covered with a thin layer of absorbent cotton wool dipped in the bichloride solution. Dry wool is packed over this and the whole is kept firmly in position with a roller bandage.

The dressings are renewed at intervals according to the severity of the case, at first when the purulent discharge is profuse, twice or thrice daily until the intervals can be extended to every day or every other day. By thus closing up the eye, the conjunctival sac is rendered comparatively aseptic at an early stage of the disease, the risk of mixed infection is diminished, rest is afforded to the eye and corneal lesions are often prevented. Where corneal lesions are already present, they heal much more rapidly and leave fewer traces behind. I have never found that the presence of an acute purulent discharge was a barrier to closing up the eye in this manner.

barrier to closing up the eye in this manner.

Pterygium may be considered for convenience amongst the diseases of the conjunctiva, notwithstanding the most recent views as to its pathology.

It is a fairly common affection in the tropics, especially amongst seafaring people, and amounted to

3.4 per cent. of the cases of general diseases of the

eye.

The treatment has varied according to the nature and severity of the cases. In mild forms, where there are only a few dilated and tortuous vessels in the horizontal meridian with recurring congestion of the surrounding conjunctiva, obliteration of the vessels by means of the actual cautery has often secured excellent results. In the way of after treatment, tinted glasses are prescribed to be worn when exposed to bright sunlight. Circumscribed fleshy pterygia have been dissected away, the spot where it was adherent to the cornea scraped, the edges of the conjunctival gap freed from the sclerotic and stitched together.

In the case of more diffuse fan-like pterygia, I have performed Desmarre's operation of transplantation. The little lump underneath the conjunctiva caused by the presence of the deflected pterygium soon becomes absorbed, and in seven cases operated upon in this

fashion, the results have been excellent.

A case of cedema of the conjunctiva will be considered when dealing with malaria and eye disease.

Diseases of the Cornea do not call for much special attention, with the exception of ulcers, in which cases closed dressings have always been applied, and as in gonorrheal cases, the effect of this method has been most marked. In cases of granular lids with pannus ulcers, the treatment of the lids can be combined with the method of closed dressings, and the result has often been so striking that one is led to believe that the rest afforded to the lids has done as much good to the granular lids as to the cornea.

Diseases of the Eyelids.—Cases of trichiasis and entropion were treated as the case demanded. Division of the outer canthus, displacement, or transplantation of the hair follicles by Arlt's method, and the Streatfield-Snellen operation all gave good results in cases of long standing trachoma in Arabs and

Malays.

Two cases of primary syphilitic sore of the eyelids were observed, one in a young male Chinese, the other in a Chinese female, and one case of gumma was also noted. A case of paralytic ptosis in beri-

beri will be referred to later.

Diseases of the lachrymal passages have been in my experience totally absent, with the exception of one case of dacryocystitis in a female Eurasian, I have never noted anything approaching trouble of the lachrymal passages in Chinese. This is due, I believe, to the anatomical configuration of the nasal duct and bones in this race.

Diseases of the iris and ciliary region were mainly of a syphilitic nature and will be referred to in discussing syphilis and leprosy, when also diseases of

the choroid will be mentioned.

Amongst the diseases of the retina there were some

interesting cases.

Temporary Partial Scotoma in one Eye.—This was the case of a European male who came to me with the complaint that as he was walking along the street he found that the sight had suddenly become impaired. On examination, there was nothing to observe in the external appearances. The media and internal structures seemed to be perfectly normal, but it was discovered that there was an absolute scotoma involving the lower and outer quadrant of the field of vision in the right eye. The same thing had occurred some years previously and had passed off quickly, as this attack did in the course of a few hours, without leaving any traces.

Night Blindness.—Three cases were noted. One of these was independent of any condition of the general health, such as fever, the other two occurred

in sufferers from malarial cachexia.

Central amblyopia accounted for eight of my cases. Of these, six were traced to tobacco and two to alcohol, and of the latter one occurred in a male and one in a female. The cases of tobacco amblyopia were all adult males and there was no doubt that in most, alcohol helped to bring on the affection. It may be noted as a point of interest that considering the amount of tobacco consumed one may say from experience that tobacco amblyopia is really a rare disease in the tropics. It may be that cigar smoking is not so toxic as the pipe, or the filthy habit of chewing tobacco which so often prevails amongst workingmen in England.

Central scotoma, or "sun blindness." Two cases due to the direct action of sunlight were met with. In one case, that of an officer in a steamship, the blindness came on directly after trying to take an observation in the bright sunlight without having previously shaded the eyepiece of the sextant with the usual smoked glass provided for the purpose. The ophthalmoscopic appearances were negative.

The other case arose in a young Siamese, an eager and clever student of mathematics and astronomy, whose zeal unfortunately led to the development of a central scotoma by observing an eclipse of the sun through lightly tinted glasses. With the ophthalmo-scope, there was noted a condition of marked injection of the retinal vessels around the vellow spot which showed up very clearly amidst its deep red surroundings. A month later it was noticed that there was some deposit of pigment around the region of the yellow spot. The visual acuity which had improved from  $\frac{20}{60}$  to  $\frac{20}{40}$ , never improved further.

Without going further into a description of the various regions of the eye affected, it may be more interesting to note the various conditions which seemed to be due to such diseases of the general

system as syphilis, malaria, &c.

The syphilitic diseases of the eye show certain peculiar features in these tropical cases. The regions affected were as follows:—cornea 6 cases, sclera (gumma) 1, iris 16, ciliary region 3 (of these two were cases of gumma), choroid (choroiditis 4, chorio-retinitis 6), retina and optic nerve (neuro-retinitis 3, atrophy of optic nerve 4), eyelids (primary sore 2, gumma 1).

Special note was made of the early appearance of iritis after the advent of the primary sore amongst native races, in fact in one case, iritis appeared four weeks after the appearance of the sore, which did not heal until the iritis had yielded to mercury. In its severity and after effects, syphilitic iritis, especially amongst natives, appeared to me to be a much more severe disease in the tropics than in temperate climates.

Of course in the two cases of gumma of the ciliary

region, the determination of vision was marked, in one amounting to counting fingers at 2 feet, the other to counting the time on my watch at 14 inches.

In the case of tertiary manifestations in the choroid especially a common history amongst Chinese was that the patient came to have his eyes tested for glasses, presbyopia having manifested itself apparently. The subjective tests failing to give normal vision, ophthalmoscopic examination revealed the presence of patches of choroiditis, often evidently quite recent in character. Upon interrogation the patient was brought to remember that fifteen or twenty years previously he had noticed a small sore, had gone to a European doctor who had given him a bottle of medicine and told him to be sure to continue treatment for a long time, as he was suffering from a "bad The disease had belied its name, however, in his case, as one bottle of medicine had cured the sore and so he troubled no more about it. Such is quite a common history in my experience of the Chinese of the Straits Settlements. There is no doubt that the disease partakes of a mild character in many cases, and the results of specific treatment of these tertiary lesions of the eye were as a rule very satisfactory.

Malarial Affections of the Eye.—The proportion of these cases was 2·2 per cent. A condition which I have not yet seen reported was noted in one case, i.e., ædema of the ocular and palpebral conjunctiva. The following are brief notes of the case:—A wealthy half-caste fleeing from Manilla at the outbreak of the rebellion against the Spanish, stopped at Singapore for a few weeks, where he had a slight attack of ague and fever. The morning following the ague, I noted ædema of the ocular and palpebral conjunctiva of the left eye. The patient stated that this was a common sequela of an attack of ague with him. The following day the ædema was practically gone. The visual

Corneitis of a central superficial nature, amounting to little more than a haziness of the epithelium, was noted in an Arab, after a sharp attack of malarial fever. Corneitis in patches of a superficial type occurred in a European surveyor in Siam, who had suffered much from fever. It passed through a stage of ulceration before recovery. In him, too, optic neuritis was observed in the left eye.

acuity never suffered during these attacks.

A form of interstitial keratitis has been described by Poncet and Javal as a sequela of malaria. In one case, a Malay, I could not account for the keratitis, unless it were due to malarial poisoning.

Cortical cataract developed in the right eye of a young adult Tamil, without history of traumatism or glycosuria, while recovering from a severe attack of malarial fever contracted in Java.

Retinal hæmorrhage of a flame shape outline was noted in one case after much malarial fever. Two cases of optic neuritis were also noted as malarial, and a marked case of retrobulbar neuritis in a European may be described briefly. The patient was recovering from a very sharp attack of fever, contracted at Batu Pahat, one of the most malarious spots of the Malayan peninsula, and noticed one day that sight in the lower part of the field of vision had become very dim. The following day the upper half

followed suit, and in three days he was stone blind in the affected eye—the left. On ophthalmoscopic examination, two days after the onset of blindness, nothing abnormal could be made out, but a month later, on again looking at the eye, the nerves were noted to be pale and the vessels small and rather empty. The vision never improved, and he died some two months later in the General Hospital at Singapore—the cause of death being certified as pernicious malarial fever, with cerebral and hepatic complications.

Night-blindness occurred in two cases. Both patients had suffered much from malarial fever. In one an ophthalmoscopic examination was made at night time, when dimness of vision was present, and it was noted that the discs and fundi were paler than during the day, the vessels seemed to be somewhat empty and showed pulsation. Glasses did not improve vision. Both cases recovered under the influence of quinine.

Beri-beri. — Amongst hundreds of cases of this disease, I have never seen any special eye conditions except in one only, of which the notes are as follows:—

N. A., aged 17, came to me complaining of ædema of the feet and ankles, of a dead feeling in the feet, of dyspnæa, difficulty in walking, and of ædema of the eyelids. On physical examination, the heart reveals the usual tumbling action of beri-beri, with reduplication of the second sound, especially on the right side. The eyes are normal, with the exception of some slight conjunctival injection with ædema of the lids. Five days later, it was noted that the ædema of the lids had gone, but that there was distinct paralytic ptosis in the left.

Leprotic Affections of the Eye.—In cases of leprosy, it would seem that the chances of the eyes becoming involved, the date of the appearance of the lesions and their type, all depend upon the variety of the disease whether it be the anæsthetic, tubercular or mixed form.

Taking first the purely anæsthetic form, we find that of twenty cases of leprosy in which the exact duration of the disease was known, five cases belonged to this variety. The duration of the symptoms in these five cases ranged from fourteen years to eight months, the average being 4.9 years. Now how were the eyes in these cases? In all five, the eyebrows and eyelashes remained intact, in two there were maculæ on the lids, while in two there was some chronic conjunctival catarrh without any apparent paresis of the lids. In another case, chronic conjunctival catarrh was due to paresis of both lower lids, but without corneal lesion. One of the cases of conjunctival catarrh was accompanied by weakness of the orbicularis in both, not amounting to paralysis, and a peculiar pannus corneitis in each eye. This corneitis took the form of a crescent which involved the upper marginal segment of the cornea. concave border of the crescent was raised and sharply defined, while the remainder of the cornea was clear.

No other lesions were noted in any of these purely anesthetic cases.

In the tubercular form, however, we find a more serious state of affairs. Of the twenty-three cases

already mentioned, ten were purely tubercular, the duration ranging from fifteen to four years, the

average being 8.9 years.

The supraorbital arches were thickened in 9 of the 10 cases, the eyebrows thinned or lost in 8, and the eyelashes thinned or gone in 8. The eyelids were thickened from deposit of new tissue in 7 cases, and actual leprotic tubercles were evident in one case. In another case it was noted that slight entropion was present in both upper lids without any evidence of trachoma.

(a) Of the conjunctiva, slight chronic catarrh was noted in two cases, but like that noted in the anæsthetic cases was due, I believe, to lowered vitality and confinement and was not actually leprotic in nature. A tubercle of the conjunctiva was noted in one case in one eye at the outer horizontal meridian of the corneo-scleral margin, while in another case, which I shall report more fully, the development and subsequent deep extension of a conjunctival tubercle was well shown. The case was that of a Chinese female aged 17 years, who had suffered from tubercular leprosy for six years. The eyebrows and lashes were gone, and the supraorbital arches were thickened. In the right eye, to the outer side of the cornea in the horizontal meridian, is a tubercle involving the conjunctiva, sclera and probably the ciliary body. adjacent area of the cornea is opaque and so also the adjacent half of the lens. It is remarkable to note the entire absence of anything like inflammatory disturbance of the rest of the edge, for the remainder of the cornea and lens are perfectly clear and the iris unchanged. The aqueous, too, is perfectly clear. Fingers are counted with difficulty. In the left eye of the same patient, there is in the upper and outer quadrant of the corneal periphery, a patch of condensation with a few vessels passing to it from the conjunctiva. The corneal condensation passes inwards in advancing lines, as it were, and involves all the layers of the cornea. One week later it was noted that the tubercle in the right had doubled its size, that the lens was wholly opaque and that the iris was hazy and pulled over the tubercle which was apparently growing inwards through the ciliary region. The cornea, too, was nearly all hazy. In the left, the corneal condensation was more advanced and now at the corneal margin a tubercle had formed. The disease had been present already six years in this case. In another case, a Chinese female aged 28 years, suffering already fourteen years from the mixed form, there was noted a greyish tubercle of the conjunctiva on the outer side of the right eye. It was almost non-vascular, with the exception of a few vessels running to it from the adjacent portion of the conjunctiva. The tubercle seems to be entirely in the conjunctiva at present and as in similar cases, a noteworthy feature is the absence of inflammatory disturbance in the adjacent cornea, although the tubercle is quite at its edge. The cornea was affected in some of these cases either primarily or secondary to growths in adjacent portions of the eye. A condition of pannus corneitis was noted in two tubercular cases and took on the same form as I have already described in a case of anæsthetic leprosy. The opacity was in all three cases confined to the upper

part of the cornea, it extended from the corneo-scleral junction in the form of a crescent whose free border was concave and distinctly raised above the surface of the underlying cornea, and was sharply defined, while at the corneal border it shaded gradually away into the conjunctiva. It was totally unlike the pannus condition which one sees in cases of trachoma.

(b) Ulceration of the cornea was observed in a case of mixed leprosy of six years' duration, which presented a tubercle at the edge of the right lower lid, paralysis of the left lower lid and a non-vascular ulcer in the lower segment of the left cornea. The ulcer could only be seen by oblique illumination and was not accompanied by any haziness of the cornea. Primary interstitial keratitis as above reported was seen in one case to precede the development of a tubercle at the outer corneo-scleral margin. The keratitis took the form of fine parallel lines of condensation passing into the cornea from the periphery and involved the deeper layers. These lines had advanced, extended, and coalesced when the case was seen a week later and a tubercle was evident at the corneo-scleral margin.

Such were the primary lesions of the cornea, while of lesions of a secondary type an advancing superficial and deep corneitis was the usual concomitant of progressive lesions in the neighbourhood, such as tubercle of the conjunctiva, iris, or ciliary body. In all these cases, however, the non-vascular nature of

the keratitis was a marked feature.

(c) Coming now to conditions of the iris, it was noted in one case, that of a female, aged 28, who had suffered from the mixed form for eighteen years, that repeated attacks of iritis preceded the formation of leprotic tubercles in the iris and ciliary body. In this case the following lesions were noted: tubercles of superciliary arches and lids, eyebrows gone, lashes thinned, both lower lids paralysed; in both, some conjunctivitis and lachrymation; tubercles of a yellowish red colour in the left iris at the outer side close to the ciliary attachment of the iris; a tubercle in the ciliary body at the corneo-scleral border is evidently advancing towards the surface; the cornea and iris are hazy throughout, especially near the tubercles; tension plus. A chronic form of serous iritis with keratitis punctata was observed in a case of anæsthetic leprosy of fifteen years' duration. The case is of considerable interest owing to the good recovery made, and merits rather a more lengthy report than the former cases. A Eurasian lady suffering from a mild form of anæsthetic leprosy had been treated for some years with "hvang-nan and realgar, by Dr. Galloway, of Singapore. siderable improvement had taken place and when Dr. Galloway asked me to look at the eyes, the skin troubles were completely quiescent. The condition of the eyes was as follows: Catarrhal conjunctivitis in both eyes of ten days' duration; two small opacities in the deeper layers of the left cornea in its upper and inner quadrant near to the centre. The irides, which are slightly irregular at the pupillary margins, react slowly to light and accommodation, but dilate freely with atropine. By the ophthalmoscope the media are seen to be clear and nothing abnormal is noted. The visual acuity is normal in each. A simple anti-septic lotion was prescribed and the catarrhal

symptoms passed off rapidly. A year later, the following notes were taken: Irides still irregular at pupillary borders; they react more slowly than before to light and accommodation; visual acuity normal; media clear.

Thirteen months later, I was consulted because of dimness of vision which had been noted for six months or so, and noted as follows:—V. A., R.,  $1\frac{1}{2}$  Sn., V. A., L., 4 Sn.; lens normal; in both, the ocular conjunctiva is slightly edematous and very pale pink. There is no deep circumcorneal injection. Besides a few spots of opacity in the upper and outer quadrant of the left cornea already noted, there is a ring of pale grey opacity about 1 mm. broad at the periphery of each cornea. In both there is a typical triangularshaped area of fine dust-like deposit on Descemet's membrane in the lower portion of the cornea. The deposit is of a pale greyish-brown colour. aqueous is quite clear in each, the irides are swollen, irregular at the margins, and do not act to light or to accommodation. Tension is normal. The palpebral conjunctivæ are healthy. Under the influence of atropine, the pupils dilate slowly but freely, but the borders still remain irregular. The colour of the irides does not seem to have changed since I saw her first. There are no posterior synechiæ but upon the anterior capsule of each lens there is a ring of pigment spots which mark the site of the pupillary margin in each eye when mydriatics have not been used. With the ophthalmoscope the details of the fundus cannot be clearly made out owing to the condition of the cornea and of the anterior capsule and also because of considerable vitreous disturbance as well. There is no ciliary tenderness on palpation.

In the way of treatment, cocaine was employed as a mydriatic to be applied every few days only, and an ointment of yellow oxide of mercury was ordered, with which to massage the cornea twice daily.

The result of treatment was excellent. The corneal and deep opacities gradually cleared up and the visual

acuity rose to normal again.

Such a happy termination is said to be rare in leprotic iritis, although according to Bull and Hansen, iritis and irido-choroiditis are more amenable to treatment than corneal affections.

No deep lesions of the eye were noted, although many ophthalmoscopic examinations were made in

lepers.

In concluding these notes on leprotic lesions of the eyes, the following are the statistics derived from an inspection of 101 Chinese lepers in whom the duration of the disease could not with certainty be made out.

Suffering from ey	e les	ions	 44.	77
Eyes unaffected	• • • •		 	24

Eyelids and conjunctive affected in 67 per cent. Corneæ affected in 10 per cent.

WATER-ITCH; OR, SORE FEET OF COOLIES. By A. B. DALGETTY, C.M., M.D.

South Sylhet, India.

THE anonymous writer of the article on Pani-ghao, or water-sore, in the Journal for December, 1900, gives a very good clinical picture of a disease which is well-known to all medical officers having charge of tea gardens.

I have devoted a considerable amount of time and trouble to the study of this disease and had the following paper already written and lying beside me when the above article appeared. I therefore give it as it stands, although it covers a good deal of the same ground as that traversed by your anonymous contributor.

The disease might be defined as a superficial vesicular dermatitis, which occurs epidemically among coolies working on tea gardens during the wet months of the year, which solely attacks the feet, and which has considerable resemblance to ordinary scabies.

The native doctor-babus almost universally term it "water-itch" in the districts of Sylhet and Cachar, but they appear to know nothing of its cause. Sometimes they attribute it to pricks from the sensitive plant, Mimosa pudica, which grows here and there, and sometimes to very extraordinary causes, such as standing in elephant's urine and the like, but the coolies themselves all believe they catch the disease in those parts of the tea-garden where human excrement has been deposited. Indeed, it is often very difficult to persuade them to go into those places when work requires it, owing partly to the dread of getting sore feet and partly to the filth which lies about.

There is very little attempt at any kind of conservancy on most gardens, because the natives will not adopt it, so that the coolies simply go and squat down in the shelter of the nearest row of tea bushes, and the result is that in a garden with a population of two thousand coolies more or less, after three or four years the ground in the neighbourhood of the coolie huts is thoroughly sodden with ordure and affords an excellent nidus for all kinds of parasites.

This water-itch does not occur in a new garden until a year or two after it is opened out, and it varies in severity in different gardens during the same year, and in the same garden, during different years.

The prevalence of the disease also bears a close

The prevalence of the disease also bears a close relation to the general health of the labourers. In some unhealthy gardens the number incapacitated during some months from this affection alone forms half of the whole sick-list, hence it is of considerable importance to gain some definite knowledge as to the exact nature of the disease.

Symptoms.—The disease itself is a vesicular dermatitis, with some tendency to bullous formation. It begins usually in the soft moist skin in the clefts

<sup>[</sup>¹The writer of the "anonymous" article referred to, we have reason to believe, was Dr. Elliot, of Assam. The article was, however, not signed, and the usual accompanying letter did not reach us. We should be pleased to hear of, or from, Dr. Elliot, in order that we may publicly acknowledge his able and interesting article.—Editors.]

between the toes, spreads upwards over the dorsum of the foot round the instep and outer edge and burrows into the harder skin of the sole. It rarely or never reaches higher up the leg than the ankle—a line drawn horizontally round the leg at the level of the internal malleolus would mark the upper limit of its spread—and it does not attack any other part of the body, not even the hands.

At first there is some burning and itching at the point where the vesicle will form, and two days later a small elevated vesicle can be seen. Several such vesicles appear simultaneously within a short distance of one another, but they are all quite distinct and

independent.

The vesicle enlarges in a horizontal direction, becomes tortuous and very often lateral branching

cuniculi shoot out from it.

The smarting, burning and itching increase and give great trouble to the sufferer, but as a rule the patient does not scratch much, perhaps owing to the great tenderness which exists.

When once established the disease rapidly spreads, breaking out in new spots all round the foot till the victim can only stump about on the heels, or not at

all if both feet are affected at the same time.

If allowed to go on, several neighbouring vesicles may coalesce and there results a bleb which may be as much as half an inch in diameter, especially if it is located along the inner or the outer margin of the foot, where the hard skin of the sole joins the softer skin above.

The vesicles may rupture and allow an opalescent watery fluid to escape, but most of them go on to form pustules. It is rare, however, that a scab or crust is seen like that of ordinary scabies on other parts of the body, and the explanation of this may be that the wet and the friction to which the bare feet of the coolie are constantly exposed prevent a crust having time to form.

If the attack be a severe one swelling of the foot and leg is apt to occur and then a large slough may result, leading to a very troublesome ulcer. As in scabies, the dermatitis reaches down to the Malpighian layer and to the papillæ, blood corpuscles being often

obtained in scrapings of the burrows.

The disease, as might be expected, affects chiefly those coolies that are in a weak state of health; anamia from various causes is very common in many teagardens, especially amongst the women, and it is these

cases that suffer most severely.

During the wet season the feet of the coolies become bleached and softened through the continual wet. Their work, plucking the tea-leaf, takes them over the ground all sodden with filth; many of them are puffy and ædematous from anæmia, and such people after a long days' work have little energy and often less inclination, to wash their legs thoroughly; hence the personal conditions are all favourable to the invasion of parasites.

The men suffer less frequently; their work is different, they are more robust, and some of them wear shoes. It is the exception to see the disease

in a healthy, clean, dark-skinned coolie.

During the period of its prevalence, that is to say, from July to October, the moisture in the ground is at

its greatest, and the temperature in the shade runs from a maximum of 87° F. in July to a minimum of 70° F. in October. After the latter month the disease disappears completely until the next rainy season. The ground dries up and becomes quite hard, so that it does not stick to the feet. The climate suits the coolie better, work is lighter, the anæmia diminishes and the materies morbi seems to lose its vitality.

This water-itch does not attack the natives living in the crofts round about; this may be due to their methods of conservancy being quite different, human filth not being allowed to collect in one area and also because being indigenous they are more robust than

the imported coolie.

Ætiology.—So far as I have been able to discover by inquiry of the native doctors, and from medical officers of tea-estates, and through questions in the Indian Medical Gazette, nothing is known of the cause of this skin-disease. I have devoted a large portion of the past two years to a study of the problem and the following is the result of that investigation.

Analogy leads one at once to look for a cause similar to that of scabies communis. The location of the disease on the extremities, its tendency to spread, its liability to relapse, the itching that accompanies it, the formation of vesicles and the like, are all sugges-

tive of ordinary itch.

If one of the vesicles be opened and its contents examined under the microscope, various substances will be found. If taken early, before pus has formed, perhaps only a few blood cells, serum, and some grains of sand will be seen. Later, other foreign bodies are found, such as the spores of several moulds—of which aspergillus glaucus, mucor mucedo and cladothrix dichotoma are the chief organisms of suppuration—especially the staphylococcus pyogenes aureus, rapidly moving diplo-bacilli which are very common in many putrescent fluids, fæcal matters and such like, and which would seem to be the swarming rodlets of the bacillus subtilis, blood corpuscles, pus cells, particles of sand, fibres of cloth and other extraneous substances.

If care, however, is taken to evacuate the pustule completely and to remove at the same time any crust that may surround the spot, then in a certain percentage of cases one or more greyish, ovoid bodies may be seen lying perhaps under the shelter of a little

heap of débris (fig. 1).

These elliptical bodies are the ova of an acarus. Occasionally one may be fortunate enough, if the microscope is handy, to see a living acarus sprawling in the fluid or making off from the field of vision.

The best way to take a specimen is to slit up the tunnel of the vesicle and remove the contents with the spoon end of a director or other small scoop. When the vesicle is pricked, its contents often spurt out a distance of two or three feet, showing that there is great tension within, a fact which may partly account for the itching and discomfort that accompany the disease.

It is easy to overlook the ova in the midst of the débris, so in order to make sure whether any are present or not, the specimen should be carefully covered up, laid aside for a day or two and kept

moist by placing a drop of sterilised water on the slide. It is better not to put a cover-glass over the specimen, for if this be done the young acari have hardly room to develop and less air and moisture are obtained.

Life history.—The ovum is ellipsoidal in shape, has a length of 40  $\mu$  and a breadth of 20  $\mu$ , is of a greyish hue increasing to a darker shade towards the periphery; its contour in certain positions is not quite symmetrical being somewhat flatter on one side than on the other, its surface is finely pitted (fig. 2, a). After lying dormant for about three days, the egg shows a denser appearance at one end, the yolk separates slightly from the egg-envelope, and in two days more the first signs of the embryo appear as faint lines crossing the centre of the egg (fig. 2, b). The different parts of the embryo soon become differentiated, movements begin to show themselves, and then little time is lost before the young mite kicks off its mantle and walks out as an active six-legged larva.

The empty egg-shell splits up as a rule like a peapod, or sometimes a cap-like piece is pushed off one end and the little pits are now more easily seen as black dots all over the surface (fig. 2, c).

The larva has the general appearance of the adult only it is smaller, has yet only three pairs of legs, and possesses an anal slit but no sexual organs; there is a stout bristle on either side of the body about the point where the missing pair of legs will appear, and the tarsi are furnished with hairs and ambulatory processes as in the adult (fig. 3).

The young acarus does not run about long as a six-footed larva, but after feeding for one or two days settles down into a quiescent state, called by Claparede<sup>1</sup> the "second-ovum stage" and by Megnin<sup>2</sup> the "nympha."

The legs are gathered a little underneath the body, the larva shows no sign of life, not even when touched, the general appearance of the whole mass becomes hazy and indistinct, and swells up into an ellipsoidal form like the original ovum. After a rest of two or three days the change is complete, the young mite frees itself from the old skeleton and comes forth as a four-legged individual.

This moulting-process is a true rejuvenescence, the new acarus being formed within the body of the old, whose empty structure is left lying in the field: it is not merely a casting of a skin like a snake, for the developing members can be seen lying across the creature's body through the old transparent skeleton.

There are still, however, some adult characters wanting. The body is smaller, the bristles, especially those on the extremity of the abdomen, are shorter, and the sexual organs, in the female at least, are undeveloped.

The male has reached its final evolution, being possessed of a complete sexual apparatus. But both male and female are pubescent and it is now that impregnation is effected, for although the female still lacks the true vagina, that organ is not yet necessary, since fecundation is brought about by means of the ano-vulval slit.

Copulation, which I have witnessed, takes place in the following peculiar manner.

The dorsal aspect of both mites is directed upwards, that is towards the observer, and the two heads away from each other, so that the under surface of the abdomen of the male covers the upper surface of the abdomen of the female. The male fixes himself there by means of two suckers situated on either side of his anal-slit, and overlaps the female to about one-fifth of her length. In this position the sexual organ of the male, which lies forward between the hindmost pair of legs, corresponds with the vulvo-anal slit of the female, which lies at the extreme posterior border of the abdomen. The female, which is the larger and stronger, may be seen dragging the male about in this attitude (fig. 4).

When fecundation has occurred the ovigerous female rapidly develops a true vulva through which the ova, which very quickly form, are deposited. This vulva is situated between the hindmost pair of legs, just as in the male, but from its peculiar position it would seem to be inaccessible to the male, at any rate coition takes place through the vulvo-anal slit as described.

General characters of adult.—The body is ellipsoidal, slightly narrower towards the anterior extremity, convex in both directions above, flat antero-posteriorly and convex laterally below, of a glass-grey colour, skin easily ruptured.

Rostrum of medium length, conical, no cheeks, legs long, five jointed, all seen outside margin of body, endpiece furnished with simple ambulatory pedicle; male provided with two copulatory suckers; no abdominal lobes present. The profile of the mite, especially that of the snout, resembles on a small scale the profile of the ordinary field-mole.

The colour of the body when empty is a glassy-grey, but if the stomach is full of half digested food, it gives the impression of a greenish-yellow tint, merging into a greenish-brown in the rostrum and limbs and where the body is covered by the skeletal plates.

Anatomy.—The rostrum is composed of a chin supporting a horse-shoe-shaped maxilla, to which two unsegmented palpi are hinged.

These palpi end in blunt nose-like processes and carry a short stout hair near the extremity.

In the space between the palpi, lie the two incurved sickle-shaped mandibles which are not serrated, and which, when at rest, are covered for the greater part of their length by the labium. Outside the rostrum on either side and springing from the groove that marks the cephalo thorax arises a strong plumose bristle, which curves inwards and forwards as far as the tip of the corresponding maxillary palp. This bristle would seem to take the place of the so-called "cheeks" in other species (Megnin, op. cit.).

No organs of vision can be detected. A few faint lines run round at the junction of the head and thorax, and the triangular sternum runs down in front.

Immediately outside the sternum the epimera of the first pair of legs can be seen at the point of their attachment to the body. The two anterior pairs of legs arise near together, close to the root of the neck; they are similar in size and are furnished with similar appendages.

Midway between the anterior and posterior groups

of legs two fairly long bristles project, one from either

side of the body (fig. 5).

More posteriorly the two hinder pairs of legs take their origin, much nearer to the middle line of the body than in the case of the anterior group.

All the legs of this group are also similar to one another, but they differ in some respects from those of the anterior group. These differences will be mentioned afterwards.

The convexity of the abdomen is furnished with fourteen long hairs, some of which spring from the dorsal and some from the ventral aspect (fig. 7).

In the middle line from before backwards the following parts can be made out: a faintly defined gullet leading down into the general body-cavity in which numerous droplets of half-digested food float about; the sexual organ, male or female, lying between the posterior pair of legs; more posteriorly the anal-slit, furnished in the male with two suckers, in the female with only three short hairs on either side. Towards the outer margins of the body, and hidden by the attachments of the posterior pair of legs, two kidney-shaped bodies, which are probably concerned with excretion (fig. 7, ex); near the analslit, a round dark movable body which can be expelled by a little pressure and is really a lump of excreme; and finally in the ovigerous female an ovum may be seen in the vicinity of the vulva.

No respiratory apparatus can be detected.

Digestive system. - No definite organs seem to exist for the purpose of digestion, but very often a rounded, yellowish ball may be seen lying in the body-cavity between the anterior and posterior groups of legs (fig. 5). Movements take place in this substance, and newly-ingested particles appear to go first to this spot, and after a short stay are set free to float as small oily drops in the general body cavity (cf. Berlese<sup>3</sup>.) The refuse collects in the posterior part of the abdomen, and is voided as the little greenishbrown pellet before mentioned (fig. 5).

Sexual organs.—The adult male acarus has a length

of 0.18 mm., and a breadth of 0.08 mm.

The sexual apparatus has a triangular shape, being formed of two lateral plates hinged together anteriorly and furnished on either side with two goblet-like suckers, besides one or two short bristles. plates diverge posteriorly to enclose a lipped cavity, which contains a circular object, no doubt the penis. No signs of any kind of testis can be seen (fig. 5)

A short way behind the penis lies the anus, bounded by four short hairs and the two suckers, which are so

necessary during copulation (fig. 5).

The adult female acarus has a length of 0.20 mm..

and a breadth of 0.09 mm.

The true vulva, which, as before noticed, is not concerned with impregnation, lies in the same position as the male generative organ, from which it does not differ very much in general appearance (fig. 5).

Two tailed plates meet in the middle line, leaving a triangular space between them in the depth of which it is difficult to make out any definite structures. Round the margin are four short hairs but no suckers.

The anal-slit in the female lies at the extreme end of the abdomen, a position which the peculiarity of the act of copulation renders necessary. It is provided with six short hairs, but has no suckers.

Appendages .- Numerous hairs and bristles, in addition to those mentioned in special places, are found on the dorsal and ventral surfaces and attached to the leg segments.

The outline of the acarus, when seen from the dorsal aspect, is much more regular than when seen from the ventral aspect, owing to the attachments of the legs

being concealed beneath the body.

Five pairs of strong hairs, or bristles, are usually found on the dorsal surface; one pair projects over the snout, a second pair arises at the junction of the cephalo-thorax, a third, fourth and fifth pair are attached more posteriorly. All the longer hairs on the body are plumose (fig. 7).

The legs are composed of five articles, the first being covered at its juncture with the body by the

epimeron.

The first, second and third articles carry each a short, stout bristle; the fourth has one short and one very long bristle, and in addition to these, in the angle between the long bristle and the leg, a prominent finger-like process projects. When the fifth article becomes over-flexed, this process as well as the long bristle being situated on the convexity of the joint, come into contact with the surface upon which the acarus is walking.

On the extreme end of the tarsus there is a nodular pad or caruncle which possesses a sucker-like action during locomotion, while on the outer edge of the tarsal extremity are a few short hairs and a curved unsegmented, finger-like hook which is constantly flexed and extended during the act of walking. When the mite dies this process is retracted and lies along the margin of the circular end-piece of the leg (fig. 6).

The two posterior pairs of legs are slightly more slender than those of the anterior group, but otherwise, except in one particular, they are exactly the same. The exception is that the finger-like process at the root of the long bristle on the fourth article is This distinction holds good in every case.

The foregoing description of the anatomy of this acarus would seem to place it among the Rhizo-glyphineæ, and it might be called the Rhizoglyphus parasiticus, none of the latter sub-species having hitherto been found as human parasites.

Specimens can be kept alive for many weeks, so long as animal matter, such as blood-corpuscles, pus, fæcal matter, gelatin and the like, are supplied. the more active the warmer the temperature is.

It may be looked upon as a rhizoglyphus mite living on decaying animal substances at the surface of the ground, and only accidentally becoming parasitic on man in certain favourable circumstances. Repeated attempts to discover the mite in its natural habitat in external nature have, however, been unsuccessful.

Only once a four-legged mite, not unlike the young form of the acarus in question, was found in a sample of mould contaminated with fæcal matter. But owing to its being surrounded with particles of sand and earth it was not possible to examine the specimen with a power greater than a quarter-inch objective, so that the details of the mite could not be made out (fig. 8).

As before mentioned, the disease is not present in young tea-gardens till several years have elapsed, a fact which goes to support the idea that it is not until the ground has become saturated with animal refuse, especially human excrement, and not until the bushes have grown tall enough to keep the sun's heat from drying up the ground too rapidly, that the acarus finds suitable pabulum upon which to live.

As to the means by which a place first becomes infected, it is not improbable that dung-beetles, which are very abundant here, may be instrumental in doing so, as the following discovery will show. Four of these beetles had been kept in a bottle for two days, and in the greenish discharge which they voided was found a living Dochmius duodenalis, the young form of the human intestinal parasite, the Anchylostoma duodenale, which abounds amongst the coolies in most tea-gardens (fig. 9).

The beetles most likely had ingested the ovum, which become hatched when expelled from the intestine, for only the ova are evacuated from the human host, unless after drastic doses of thymol.

If the dung-beetle can convey the ovum or the embryo of an intestinal parasite from place to place, it may equally well carry those of an acarus from an infected to a non-infected area.

Whether the disease is contagious between person and person it is difficult to say; it certainly spreads quickly from point to point on the foot of the individual affected, and it relapses again and again.

Other vesiculo-bullous skin diseases bearing some likeness to water-itch are: Craw-craw (Davidson's Trop. Dis.), Bullous Disease of Hands and Feet (Hutchinson), Cheiropomphyl (Hutchinson), Stomatitis Epizoötica (Siegel), and Foot and Mouth Disease in Man (Allbutt). Megnin' also in the Bulletin de L'Academie de Medecine for August, 1897, describes an arachnid, which sets up an acute inflammatory cedema of the arms and hands, but this is caused by the ingestion of the young spiders that adhere to the shoots of l'Aroche (Atriplex).

The present disease differs from some of the above in that only the feet are affected, and from others in

that the mouth is never attacked.

Ordinary scabies, due to the Sarcoptes hominis, is extremely common amongst Indian coolies; but its distribution, except that it is less common on the feet, its behaviour and its ætiology are identical with those of the same disease in Europe.

Treatment.—The treatment would be fairly satisfactory were it not that re-infection is so common whenever the victim returns to work in the dirty

parts of the garden.

The application of a strong solution of lime and sulphur is a good means of cutting short the malady; strong phenyle lotion is also beneficial, and a coating of coal-tar acts for a time as a prevention against infection; but when once the vesicles have formed pustules are sure to follow, and then the only remedy is to slit them up, evacuate the pus and thoroughly disinfect them.

It might be thought that some change could be effected in the habits of the coolies as regards conservancy, but this is next to utterly impossible.

One plan, however, which promises good results, has been adopted on one garden at my suggestion, namely, the wearing of closely-fitting shoes, with the front part reaching high up on the back of the foot,

so that no part of the skin will come into contact with the ground. These shoes are put on when the labourers are working in the foul parts of the garden near the coolie-lines, and then laid aside till again required.

Postscript.--Since the above was written the feasibility and the value of wearing shoes as a prevention against the disease, have been completely proved.

The reason that coolies do not wear shoes as a rule is the very potent one that they cannot afford to pay the price. Any caste prejudice, which they may have against wearing shoes being very superficial, is easily overcome, especially when they see that that it is to their own interest and advantage to do so; but it is the stock argument of the theoretical objector, usually an unwilling manager, to say that the coolie objects to do this or do that when it is a question of a little extra expense in the medical department.

I can speak more highly also of coal-tar, both as a

preventive and as a curative agent.

The rod-like crystals mentioned by your correspondent as being found occasionally in the discharge from the vesicles, I have also seen, but as they appeared only when the preparation had been treated with gentian violet I looked upon their presence as an

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<sup>4</sup> Megnin (M.P.), Bullet. de l'Academ. de Medecine, August, 1897. Also generally—Article, "Arachnida," in Ency. Britannica, and Fleming's Transactions of Neumann's Parasites and Parasitic Diseases. London, 1892.

Some Further Work on the Mosquito-Malaria THEORY, WITH SPECIAL REFERENCE TO CONDITIONS AROUND NEW YORK. By Dr. William N. Berkeley .-Of the three species of Anopheles native to North America, the author has found two around New York: Anopheles quadrimaculatus (Wiedemann) and Anopheles punctiformis (Say). The anopheles were found always in buildings, oftenest on the walls and ceilings of recently used bedrooms, and far more abundantly in the foul and ill-ventilated bedrooms of the poor. The house females were usually gorged with blood, and sluggish enough to be easily caught. The author believes that the Health Department should require malarial cases to be reported. "It is at least as dangerous as scarlet fever, and far more of a scourge. An inspector should be sent to every infected house to instruct the people to kill all the anopheles in the house, to provide the doors and windows with screens, to isolate the patient with particular care from mosquitoes, and to cause all the standing water in the vicinity to be drained or heavily petrolised." The author believes that, by these measures, the number of local cases could be reduced by more than 90 per cent. in a year or two. The work of the Italians in this connection is referred to.—Medical Record, January 26, 1901.

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THE

## Journal of Tropical Medicine

March 1, 1901.

#### IMPORTANT NOTICE.

BRITISH CONGRESS ON TUBERCULOSIS.

This Congress, which is to be held in the Queen's Hall, Langham Place, in the week beginning July 22, has arranged, amongst other matters, for three public addresses to be delivered in the Large Hall, on Tuesday, Wednesday and Thursday of that week. The first will be given by Professor Robert Koch, discoverer of the tubercle bacillus; the second by Professor Brouardel, of Paris; and the third by Professor McFadyean, of the Royal Veterinary College.

## CLIMATIC ANÆMIA IN SOUTHERN ENGLAND.

WE are so apt to regard anæmia in the tropics as a result of malaria that it comes as a surprise to many to be reminded that climate may play a part, a large part, in causing the condition; in fact, that it may be the important factor in its production.

A few years ago the Medical Chirurgical

Society of London appointed a committee to thoroughly enquire into the climatic and balneological conditions of Southern England, and more especially of its health resorts. In this report frequent attention is drawn by several observers to the anæmic appearance of the dwellers in towns along the south west coast, in the Channel, and in the Scilly, Islands. In Cornwall, also, on the northern and part of the eastern coasts, and even at Penzance, an anæmic condition of the inhabitants was observed. But this unfavourable state of health extends into Devonshire and even into the damp climate of Dartmoor. These are facts well known to medical practitioners in the districts indicated, and the anæmia of their patients is an ever present factor to be remembered in ailments of every description. Many attribute the anæmia to the proximity of the sea and are content to term the condition one of "marine cachexia." Others, such as Dr. F. Bagshawe,1 F.R.C.P., of St. Leonards, are inclined to ascribe the disorder to "dampness and relaxing condition."

The districts indicated, however, by no means comprehend all the "anæmic area." Along the low lying valley of the Thames, Dr. Collier, of Oxford, draws attention to the prevalent anæmia met with there, and many observers testify to the endemic anæmia which has its area in the Thames Yet again in the fen districts of Cambasin. bridge and Lincolnshire "we get a heavier percentage of anæmia than anywhere else in England" (Bagshawe), and away in Derbyshire even "a similar experience of frequency comes from the valley of the Derwent at Derby."

Those who are interested in this question, would do well to peruse carefully the report of the committee appointed by the Royal Medical Chirurgical Society, and to study closely the article on "The Geographical Distribution of Anopheles (mosquitoes) in relation to the former distribution of ague in England," in the Journal of Hygiene, Vol. I. The study of these observations is of extreme interest. Practically, it would

<sup>&</sup>lt;sup>1</sup> See Presidential Address on "Points in the Development of Seaside Towns," by Dr. Bagshawe, The Journal of Balneology and Climatology, January, 1901.

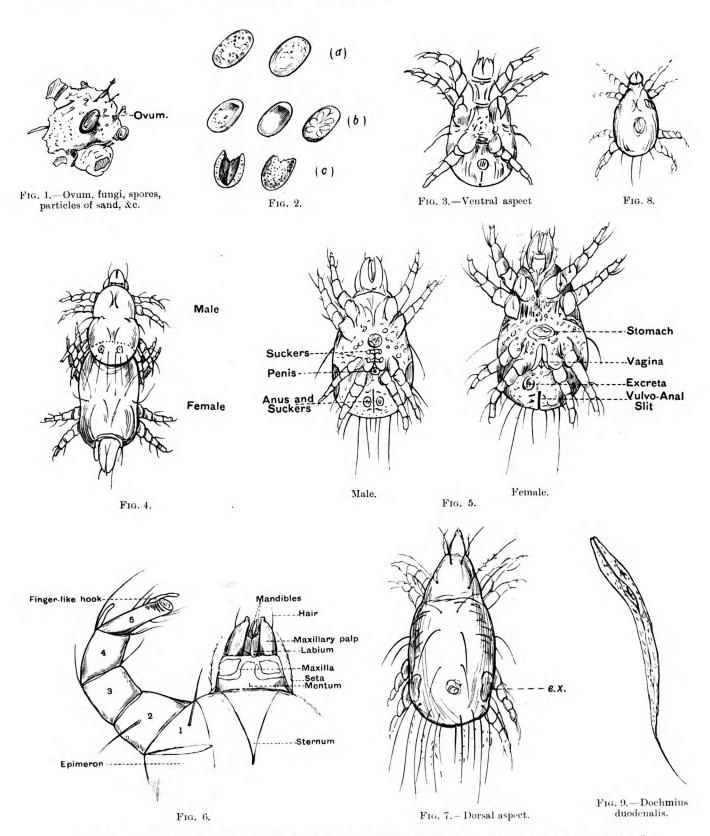


Plate illustrating Dr. A. B. DALGETTY'S Article on "Water Itch; or, Sore Feet of Coolies in Assam." See page 73, March 1, 1901.

Fig. 1.—Ovum, with debris, &c. Fig. 2.—(a) Ovum finely pitted; (b) Ovum showing strine; (c) Empty egg-shell. Fig. 3.—The Larva. Fig. 4.—Copulation. Fig. 5.—Ventral aspects of adult insects. Fig. 6.—Head and leg of acarus. Fig. 7. Dorsal aspect e.x., kidney-shaped bodies. Fig. 8.—Mite found in soil. Fig. 9.—Young of anchylostoma duodenale.

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appear, that where ague prevailed formerly, anæmia prevails to-day, and the bearing of the one ailment to the other, gives food for reflection. The anæmia in Southern England is not due to malaria at the present day, so far as we know; yet although malaria has disappeared, anæmia remains. It may not, however, be the case, that the anæmia in each instance has a common origin. One factor is common to both the southern area and the fen districts, namely, excess of moisture in the air. In the former region it is carried in the south west wind which sweeps along with the gulf stream and breaks on the Scilly Islands, the Cornwall and Devon coasts and hills, and along the Channel ports. In the fen counties, on the other hand, the moisture emanates from the soil, and the stronger winds are easterly for the most part. In both cases the wind is off the sea and there may be an element of "marine cachexia" in each but it is more likely due to mere excess of moisture in the atmosphere, independent of any "marine" in-The condition of the air, especially when the temperature is fairly high, as along the southern shore, maintains a "Turkish bath" atmosphere, causing muscular relaxation, cardiac and stomachic incompetency and other conditions conductive to the anæmic state.

All this bears very directly upon "tropical anæmia." From a study of anæmia in England, it would appear that climate brings about this condition independently of malaria infection, and yet anæmia prevails where malaria once held sway. There is therefore justification for the term "tropical anæmia" apart from "malarial cachexia," and the two conditions although frequently, in fact mostly, combined, may exist independently. Several questions at once arise in connection with this subject. Are persons rendered anæmic by purely climatic influences more liable to contract malaria? Is the anæmia in the southern districts of England and in the fen districts, but a legacy from malarial ancestors; and is there hope of its disappearing altogether as the race continues from generation to generation, whilst the ban of malaria has been removed?

### Translation.

#### A NEW CONTRIBUTION TO THE KNOWLEDGE OF AINHUM. 1

By Juhano Moreira. (Abridged and translated by P. Falcke.)

The repeated statement of Zambaco Pascha, the specialist on leprosy, that ainhum and leprosy are identical, justifies the publication of this article. It may also prove of interest to pathologists to hear of comparatory investigations as to the appearances of the diseases in varying climates, and in different human races.

Clarke, in 1860, described ainhum as "a dry gangrene of the little toe, occurring in the natives of the Gold Coast."

Dr. Da Silva Lima, in 1867, wrote an article in the Gazeta Medica da Bahia, in which he, by preference, uses the African designation of the disease, which he learned from the Nagôs, African negroes—"Ai-nhum" with the inflexion on the first syllable, the meaning being "to saw." Other African negroes, the Iljês, call the disease "Guduram." The designation "quijila" (an abreviation of a Portuguese word signifying horror) should not be used as a synonym of ainhum, as it doubtless applies to lepra mutilans of the fingers.

A French naval surgeon, Dr. A. Collas (Archives de Méd. Navale, 1867), described the disease as occurring in Pondicherry, in Indians of the Tamil tribe, and gave the disease the name of "Exérèse spontanée."

#### GEOGRAPHICAL DISTRIBUTION.

It is a matter of difficulty to be able to fix the exact geographical distribution of ainhum, owing to the fact that many doctors confuse this affection with other illnesses.

South America.—Nearly all the cases originate from the towns' Bahia, Rio de Janeiro, Pernambuco, and Buenos Ayres; this I was able to confirm personally. I never observed ainhum in the aborigines, and Dr. Da Silva Lima reports one only, which he treated in the Charity Hospital in Bahia. At the basis of the fourth toe there was a semi-circular "tightening-in," similar to that which is seen in African negroes in the first stage of the disease.

In Bahia, cases which were very frequent forty years ago are becoming more scarce, partly because there are fewer negroes of African origin, and partly because their offspring, born in Brazil, are less predisposed to the disease; personally I have seen only nineteen cases during a practice of twelve years, and I have never seen a case in the mixed races. Dr. Da Silva Lima is correct, however, in saying that "more cases would be met with if those afflicted came to the doctors for treatment instead of going to their companions or compatriots to have the diseased limb amputated." The affected part also is frequently removed by tying round with a string, or even cutting off with a razor.

In Rio de Janeiro the affection has been confirmed by Moncorvo de Figuéredo, Pereira Guimaraes and

From Monatshefte für Praktische Dermatologie.

others, but at the present time its occurrence is very rare.

In Pernambuco I saw one case, and in Buenos Ayres cases of ainhum have been observed by Drs. Pirovani and Coni. In Georgetown, British Guiana, von Winckler observed twenty cases.

North America.—Ainhum has been observed in North Carolina by Hornaday and Pitman; it has also been seen in Philadelphia and Canada in negroes from North Carolina. Dr. J. Evans reports a case in Darlington, South Carolina, in a negro aged 74 years. The disease likewise occurs in Louisiana and West Virginia, and one case has been observed in Washington. The rarity of cases, however, may be accounted for in the same way as in Brazil, that is to say, by persons, removing, or having removed by his companions, the diseased member, which is frequently only connected by shreds of tissue with the foot.

Cases have been observed in Trinidad, West Indies,

and also in St. Thomas and Havana.

Coast of Africa.—The disease has been observed on the West Coast, and the negroes of the Kroo races are most prone to it. It also occurs in South Africa, and most frequently amongst the Kaffirs. Moreover, cases are known to exist on the Gold Coast.

The disease has been seen on Nossi-bé, an island on the north-west Coast of Madagascar, where the natives know it by the name of "Faddiditi." Moreover, cases have been seen in Réunion, Algiers, Cairo, and Suez.

Asia.—British doctors in India have demonstrated that in this part of India, at all events, there is no immunity. It exists in Dacca, Calcutta, Bombay, and other southern provinces of India. One case was reported in Goa, and some in Pondicherry, as mentioned above. It cannot, however, be said that the disease is common in India, as Crawford reports that of 2,500 surgical cases in hospital, one only appeared to be ainhum. The complaint is known in Ceylon, and one case is reported from China.

Oceania. — The presence of the disease has been frequently confirmed in Polynesia.

Europe.—The cases observed in Europe have been imported or their diagnosis doubtful.

#### SYMPTOMS.

Ainhum first exhibits itself as an incomplete circular shallow, tightening-in, or groove on the inner and lower surface of the base of a toe, close to the fold between the toe and the sole of the foot. groove the skin is thickened, or indurated, but at this stage there is neither inflammation nor actual pain. The mobility of the part is not affected, but later it may be seen that the toe (if the little toe be the one affected) is gradually separating itself from its neighbour at the root. The distal end, simultaneously, is apt to bend inwards. Gradually the groove extends round the whole circumference of the upper and outer part of the toe till a complete circle is formed. Then the toe swells and has the appearance as if it were tied round by a fine thread. There is occasional, but not constant, pain. The groove and contiguous surfaces are tender on being touched. When the tightening ring is complete the groove, formerly shallow, becomes a deep narrow fissure, appearing as if a wire were deeply sunk in the tissues.

This slow but progressive strangulation of the toes reaches such a pitch that the toe finally is simply connected with the foot by a short narrow pedicle, which can only be seen by separating the edges of the furrow, on the base of which ulcerative processes or scabs may be seen; in the former case, when the foot has not been washed for some time, the split is moistened by a fætid, purulent fluid. In the vicinity of the wound the skin becomes more tense, and the distal end of the toe becomes twice or three times its normal size. The nail undergoes but little change. In the final stage of the disease the toe can be moved from side to side, or may be turned on its own axis. At this period the first phalanx corresponding to the furrow has quite disappeared, and pain is very severe, especially when the toe is moved. Many patients pad the furrow with thread, or a bit of wadding or a strip of rag, in order to obviate the movement of the toe and to prevent it touching the ground.

LOCALISATION.

At the time of the publication of his first article (1867) Da Silva Lima had only seen the little toe, one or both, affected, but in 1880 he saw cases in which the fourth toe was the seat of the lesion, and this fact has been confirmed by many observers in various countries.

It is said that there are other seats of the disease (fingers, arms, legs), but in these the diagnosis is not incontestable. Personally I have only twice seen the ailment on any part other than the little toe. It is generally affirmed that the deepest spot, where the strangulating tightening sets in, is at a joint, but this does not always follow, as seems proved by the preponderance of cases in which the digito-plantar fold is attacked. Eyles states that in his cases the seat of the tightening was through the middle of the first phalanx.

### CASES.

Case 1.—L. C. P., African negro, aged 55, came to me for treatment in 1895. No hereditary history of ainhum or leprosy. Formerly patient was always in good health. He asserts he never had any venereal disease, and there are no traces of former syphilis.

Present state: Patient is of medium height and strongly built. The usual examination revealed a moderate degree of arterial sclerosis, otherwise negative condition, with the exception of the little toe of the right foot. He was examined with particular care for nervous disorders and leprosy, but with negative results. There were no changes in the motor and sensory functions, nor in the reflex apparatus. Muscular sense intact.

The little toe on the right foot was enlarged and had the appearance of a small round potato. It was connected to the foot by a narrow pedicle, which seemed to consist of skin and connective tissue. Twenty-five years previously the patient had observed a furrow between the toe and the sole of the foot, this gradually became greater and caused great pain, the toe meanwhile increasing in size.

The nail was still extant, but small, furrowed, and dry. The other toes exhibited nothing abnormal. Sensory disorders were not extant. Patient had been in the habit of going bare-footed, and had often

had the diseased toe injured. I amputated the toe at the metatarso-phalangeal articulation, as I wished

to examine the groove.

Case 2.—J. H., African negro, aged 48, consulted me in 1892; had always been a strong, healthy man, had no hereditary tendency to leprosy or ainhum. Had never had a venereal disease, and showed no

traces of syphilis.

Present state: Patient is a well-built man. The usual examination yielded a negative result, except in regard to the two little toes. Special attention was directed to finding symptoms which might point to leprosy or nervous disorders, but without result. The perceptions of pressure, touch, pain, and temperature were normal except in the diseased toes, which were enlarged and looked like small round potatoes. I measured the circumference of both little toes, the figures being as follows: circumference at the base of the fissure: right toe  $4\frac{1}{2}$  cm., left toe 4 cm.; circumference of the distal phalanx: right toe 8 cm., left toe  $7\frac{1}{2}$  cm. At first there had only been a small groove, which gradually increased, tightening in the toe more and more, as if it were tied up with a thread. For many months the patient had suffered much pain, especially when the toes were moved.

As the sensibility of the toes was well maintained, I decided to make deep incisions at a right angle to the direction of the fissure as advised by Da Silva Lima. The little operation was successful as regards the toe of the left foot, but the toe of the right foot

had to be amputated after several months.

#### DIAGNOSIS.

The diagnosis of fully developed ainhum is very easy, I will, therefore, only touch upon the confusion

of this disease with leprosy.

Many French observers assert that ainhum is a leprous affection, but Dr. Zambaco's Pascha's erroneous views are the most difficult to combat, on account of his accurate knowledge of leprosy. On perusing Zambaco's articles, however, it becomes clear that his arguments are based on the doubtful reports of doctors who lacked knowledge of both diseases. Dr. Adolph Lutz of St. Paulo, Brazil, protests against the opinion that "ainhum is but a form of lepra mutilans" and so does Da Silva Lima.

Lepra anæsthetica attacks both sexes equally, ainhum mostly males. Leprosy occurs in all races, but ainhum is limited to African negroes and their pure descendants. Leprosy shows no predisposition for a certain toe, or simultaneously attacks fingers and toes; indeed lepra mutilans never limits itself to one toe. Ainhum, on the other hand, is always seen in Brazil, on the little toe and more rarely on the fourth toe.

The following symptoms characteristic of leprosy or "Gafeira" in its various stages are never observed in ainhum.—disorders of sensibility, atrophy of muscles, gangrenous ulcerations, formation of blisters, necrosis, atrophy and persistent contraction of the fingers; on the other hand, the constant fissure at the surface of the digito-plantar fold of the foot so characteristic in ainhum is never seen in leprosy.

It is possible to cure ainhum in its early stages by means of incisions in the skin at a right angle to the direction of the tightening ring, as has been done times out of number by myself and others; this is utterly impossible in leprosy, the utmost the surgeon is able to accomplish being the acceleration of the separation of the part; he can mutilate the patient, he cannot cure the disease.

I have never seen ainhum and leprosy occurring

together in the same person.

#### ÆTIOLOGICAL FACTORS.

The African race is specially predisposed to this illness; they are very flat-footed and in consequence the flexor tendons of the two small toes are obliquely placed.

Men are far more subject to the disorder than women, being more exposed to wounds and injuries.

Carriers of burdens are most subject.

No age affords immunity against the disease, but the affection is seen most often in persons of 30 years and upwards.

Traumatic causes are incontestable. Injuries, such as a bruise against a stone, have frequently been

asserted as the first cause.

Many authors deny that customs, accident, or work play a part in the ætiology, but I have never observed the disorder in persons in favourable conditions of life.

COURSE AND DURATION.

The course of ainhum is always a gradual and protracted one. Between the time of the first tightening in and the development of the deep ring-formed fissure, with destruction of the phalanx, a period of from two to ten years may elapse. The case observed by Dr. J. Evans in Darlington, South Carolina, subsisted for fifty years. The longest duration amongst my cases was fifteen years.

#### Prognosis.

Ainhum is a purely local affection, and without effect on the general health or life of the patient. Nevertheless in the later stages there are pains when walking, and a certain diminution of movement. Early treatment by incising the surrounding ring will save the toe by relieving the pressure exercised on the tissues.

PATHOLOGICAL ANATOMY.

Most of the researches as to the pathological anatomy in Bahia and other places were undertaken on toes amputated in a very advanced stage of the disease. Dr. Unna, the celebrated dermatologist, applied the newest method of histological technique for the examination of sections, which were stained as follows:—

(a) Polychrome, methylene blue, glycerine-ether

mixture.

(1) The section is to be placed in Unna's polychrome methylene blue solution for from two to five minutes; (2) rinsed in water; (3) discoloured in a glycerine-ether mixture (Grübler's) for five minutes; (4) rinsed in water; (5) absolute alcohol, oil of bergamot, balsam.

(b) Methylene blue—orcein.

(1) Stain in Unna's polychrome methylene blue solution for ten minutes; (2) rinse in water; (3) discolour and drain in ‡ per cent. spirituous, neutral solution of orcein, ten minutes.

In order to discover if the bacillus of leprosy was present the sections were stained as follows:—

(1) Wash, and stain in; (2) carbol fuchsine, half an hour or longer; (3) wash; (4) nitric acid (33 per cent.), twelve seconds; (5) alcohol (80 per cent.). Rinse well.

#### HISTOPATHOLOGY OF THE TOE.

The epidermis shows considerable hypertrophy of all the strata. The stratum granulosum is broadened. The stratum spinosum is permeated by spiral sweat glands of a normal appearance. The cutis propria is formed of fairly thick, closely-placed bundles of fibres and a net of delicate elastic tissues, which exhibit roundish vacuoles between the meshes, through which the dilated blood vessels run surrounded by cells. As a whole the cellular infiltration has the character of chronic inflammation limited to the true cutis and the vicinity of the epidermis.

The dilatation of the blood-vessels only relates to the large veins of the hypodermis, the cutis, and the venous capillaries.

The shrunken bone of the last phalanx in the centre of the toe shows the symptoms of rarefying ostitis. Round the bone, inside and outside the periosteum, there are many cells.

## HISTOPATHOLOGY OF THE FURROW OF THE TOE.

The changes undergone by the skin at the site of the strangulating furrow is summarised thus: the stratum spinosum, the papillary bodies, and the upper stratum of the cutis, rich in cells, become considerably reduced. The corneous layer, in almost unchanged thickness, advances deeply into the base of the furrow, where a compression of the same takes place, and many corneous cells crumble away on account of the folding of the entire layer at the base of the fissure. Deeply, at the bottom of the furrow, the hard, dry, fibrous tissue, mixed with cells, extends to the bone.

The histological investigation as regards bacteria was negative. Only a few cocci had penetrated to the base of the fissure inside the corneous stratum. No bacilli of leprosy were visible in any part of the

I am of opinion that ainhum is primarily a hyperæmia of the skin, induced by a disturbance of coordination in the arterial and venous circulation. This view is strengthened by the darker colouring of the integument, the decrease in temperature, and the increased perspiration. The digito-plantar fold, being the locality of the normal flexion of the toes, is the original site of this chronic inflammation, in consequence of the continual movements. The inflammation, which continues, becomes gradually ring-shaped, and as the furrow becomes deeper, every movement conduces to the enlargement of the extensor and flexor folds of the toes; whereby the fibrous process of degeneration at the tightening-in spot receives a further impetus, and the tighter the ring the greater the disorders of circulation at the distal end of the toe, with consecutive stasis, cedema and hypertrophy of the strata of the skin.

#### THERAPEUTICS.

The treatment of ainhum has always been purely local. The various local measures, such as com-

presses, poultices, salves, cauteries, &c., have proved

In the first stage of the disorder the above mentioned treatment of deep incisions at a right angle to the direction of the fissure with the separation of the entire tightening ring is the correct one and this method, which is recommended by Dr. Da Silva Lima proves that ainhum is curable.

In the later stage, when the fissure has become very deep, amputation, or disarticulation at the metatarso-phalangeal joint, must be undertaken.

In concluding this article I must tender my sincere thanks to Dr. Unna for his valuable advice, and for the deep interest he has taken in this work.

WE are indebted to Major Ronald Ross, Liverpool School of Tropical Medicine, for the following information:—

#### YELLOW FEVER.

By Herbert E. Durham and (the late) Walter Myers.

Abstract of Interim Report on Yellow Fever
By the Yellow Fever Commission of the
Liverpool School of Tropical Medicine.

(1) Sufficient search reveals the presence of a fine small bacillus in the organs of all fatal cases of yellow fever. We have found it in each of the fourteen cadavers examined for the purpose. In diameter the bacillus somewhat recalls that of the influenza bacillus; seen in the tissues it is about  $4 \mu$  in length.

(2) This bacillus has been found in kidney, in spleen, in mesenteric, portal and axillary lymphatic glands etc., taken from yellow fever cadavers directly after death. In the contents of the lower intestine apparently the same bacillus is found, often in extraordinary<sup>2</sup> preponderance over other micro-organisms. Preparations of the pieces of "mucus," which are usually, if not always, present in yellow fever stools, at times may almost present the appearance of "pure culture."

(3) Preparations of the organs usually fail to show the presence of any other bacteria, whose absence is confirmed by the usual sterility of cultivation experiments.

(4) It is probable that this same bacillus has been met with, but not recognised by three other observers. Dr. Sternberg ("Report on Etiology and Prevention of Yellow Fever," 1890) has mentioned it; and he has also recorded the finding of similar organisms in material derived from Drs. Domingos Freire and Carmons y Valle; but he did not recognise its presence frequently, probably on account of the employment of insufficiently stringent staining technique.

(5) It is probable that recognition has not been previously accorded to this bacillus by reason of the

<sup>&#</sup>x27;The completion of the Interim Report, of which this is an abstract, was interrupted by the onset of attacks of yellow fever in both of us. The loss of my much lamented colleague renders it advisable to submit this shortened report only for the time being.

<sup>&</sup>lt;sup>2</sup> We find these constantly enlarged and much injected, though whether this is specific we are not able to say.

difficulty with which it takes up stains (especially methylene blue), and by reason of the difficulty of

establishing growths on artificial media.

(6) The most successful staining reagent is carbolic fuchsin solution (Ziehl), diluted with 5 per cent. phenol solution (to prevent accidental contamination during the long staining period); immersion for several hours followed by differentiation in weak acetic acid. Two hours staining period may fail to reveal bacilli which appear after twelve to eighteen hours. The bacilli in the stools are often of greater length than those in the tissues, and they may stain rather more easily; naturally the same is true of cultures.

(7) Since the bacilli are small and comparatively few in numbers they are difficult to find. tate matters at our last two autopsies (fourteenth and fifteenth) a method of sedimentation has been adopted. A considerable quantity of organ juice is emulsified with antiseptic solution, minute precautions against contamination and for control being taken; the emulsion is shaken from time to time and allowed to settle. The method is successful and may form a ready means of preserving bacteria containing material for future study. The best fluid for the purpose has yet to be worked out; hitherto normal saline with about ½ per cent. sublimate has been employed.

(8) Pure growths of these bacilli are not obtained in

ordinary aerobic and anaerobic culture tubes.

(9) Some pure cultures have been obtained by placing whole mesenteric glands (cut out by means of the thermo-cautery) into broth under strict hydrogen atmosphere. Investigation into the necessary constitution of culture media for successful cultivation is in

(10) Much search was made for parasites of the nature of protozoa. We conclude that yellow fever is not due to this class of parasite. Our examinations were made on very fresh organ juice, blood, &c., taken at various stages of the disease, with and without centrifugalisation, and on specimens fixed and stained in appropriate ways. We may add that we have sometimes examined the organs in the fresh state under the microscope within half-an-hour of death.

(11) The endeavour to prove man-to-man transference of yellow fever by means of a particular kind of gnat by the recent American Commission is hardly intelligible for a bacillary disease. Moreover, it does not seem to be borne out by their experiments, nor does it satisfy certain endemiological conditions. It is proposed more fully to deal with the endemiology and epidemiology of the disease on a later

(12) We think that the evidence in favour of the etiological importance of the fine small bacillus is stronger than any that has yet been adduced for any other pretended "yellow fever germ." At the same time there is much further work to be done ere its final establishment can be claimed. The acquisition of a new intestinal bacterium would explain the immunity of the "acclimatised."

## Correspondence.

To the Editors of the "Journal of Tropical Medicine." REFORMS IN THE ARMY MEDICAL DEPARTMENT AND DENTAL SURGEONS.

It is earnestly to be hoped that the reforms in the Army Medical Department, recently promised by Mr. Brodrick in the House of Commons, will include some scheme by which our soldiers and sailors in peace or war can have means afforded them of receiving adequate dental attention. Up to now, all the attempts made by prominent members of the dental profession, backed up by the moral support of the most prominent of the medical profession, to get this want supplied, have been met by the War Office with persistent

and uncompromising refusals.

It is doubtful if the present War Minister has ever had the necessity for such an appointment clearly pointed out to him; but it is to be hoped, if the matter is properly represented, that he will have courage to disregard old-fashioned prejudices and take the matter in hand. Evidence is daily coming in of the sufferings entailed by their being no dental surgeons with our armies. In a letter recently received, an officer in the Transvaal complains bitterly that for weeks he had been suffering from toothache with no chance of being relieved. Another, a private, writes that he was suffering such agony in a tooth, and no possibility of having anything done, that he had to look about for pincers of some kind and remove his own tooth.

The War Minister could read with profit the contribution to the Lancet made by a dental surgeon who accompanied the Yeomanry Hospital. In this account of his work he speaks of eighty officers at one place who were all in dental pain with no one to help them. The War Office requires the intending recruit to have good teeth but takes no pains whilst the soldier is in the army to have the soldiers' teeth attended to. In this, as in other physical (not to mention moral) matters, the soldier is well-nigh certain to return to civil life crippled for the battle of life, and instead of the army proving of hygienic use to the nation, it but too often proves a waste of human life and a service which "uses up" the health of the young men of the country. The parents of these lads have the matter in their own hands, and it is their business to see that their sons are not handed over, body and soul, to a service which takes but little care of him, which too often, by neglect, ruins his physique, and one in which the so-called discipline proves but a school of physical ruin.

The people have the matter in their own hands, and if they would but rouse themselves from their lethargy and deny the Government the care of their sons until assurance is given that their health would be looked after, they would be performing a real service to the country.

"DENTAL."

## Current Miterature.

#### CHOLERA.

Dr. J. H. F. Kohlbrugge contributes an able article on the vibrio of cholera. The author calls attention to the extraordinary diversity of the bacillus as regards its form, its cultures, and its pathological characteristics. Dr. Kohlbrugge asserts that Koch's bacillus cannot be sharply differentiated from several other allied vibrioes. In conclusion the author states that he is of opinion that Koch's comma bacillus is not the direct cause of cholera, and that the cause is some unknown toxin which, influenced

<sup>3</sup> We have found this sometimes useful in examining the blood of ague patients.

perchance by season, place, or other predisposing causes, transforms saprophytic vibrioes into pathogenic agents, which then become the means of propagation of cholera.—Bulletin de la Société de Médécine de Gand, September, 1900.

#### MALARIA.

MALARIA AND MOSQUITOES IN ZEELAND. By A. van der Scheer and J. Berdenis van Berlekom.

This instructive and interesting book contains a number of well-executed photographic plates, and should be read by all students interested in the fas-

cinating malaria-mosquito theory.

Formerly the island of Zeeland in Holland was considered to be the most notorious fever centre of Northern Europe, malaria being at one time endemic there. In 1899 malaria re-appeared in Middelburg, after years of freedom from the disease. Even then it was limited to one part of the town, the most prevalent types being the tertian and double tertian.

It was remarkable that this part of the town was badly drained, and the soil had been disturbed for the construction of canals. Anopheles and culex were found in dwelling places at night, but more frequently in stables. Anopheles were caught in the stables, and, on examination, found free of parasites, but after allowing the mosquitoes to bite a malarial patient, the parasites of tertian fever were found in the walls of the stomach of some of the mosquitoes. When the parasites were no longer to be seen in the blood of the patient, they were not to be found in the mosquitoes which had bitten him.

The course of development of the parasites in the mosquitoes coincided with the description given by the Italian observers. Van der Scheer observes that development is slower when the temperature is low. He never found the black spores described by Ross, nor was he able to observe the very first stage, as he only examined the mosquitoes two days after infection. Koch's statement that the parasites could only develope at a high temperature is contradicted by van der Scheer's observation, as they occurred in temperatures of 18.5° C., 14° C., and even 11.5° C.

The authors are of opinion that man is not the only host of the malarial parasite, and they suggest that mosquitoes in stables should be killed by means of

sulphurous fumigations.

Double Sciatica of Malarial Origin.—The patient, a man, aged 45, was found lying in bed, crying in anguish owing to the pains which were shooting down the backs of both legs and into the feet. This pain he described "as like that which would be caused by pouring melted iron down both legs." He had been suffering from similar attacks, although of milder character, on alternate days for a week past, and mentioned that they always commenced with a chill, followed by fever and sweating. The attack would last several hours and then pass off, leaving a feeling of soreness in the affected part. On this account malaria, of course, was at once thought of, and the opinion was confirmed when I was told that the patient had lately returned from

the tropical regions, where he had several attacks of The pain was paroxysmal; the patient would have a brief interval of comparative quiet, then he would suddenly cry out, and the flexor muscles of the leg would contract spasmodically. In a few seconds he would be quiet again. The slightest movement of either leg would bring on another paroxysm of pain. There was marked hyperæsthesia, besides which painful points were especially marked at the sacro-iliac junctures in the popliteal spaces and back of the external and internal malleoli. patient was also suffering from violent headache, the temperature was 104 · 3 degrees, and the spleen was enlarged. There was no history of syphilis, rheumatism or any other special cause for the sciatica. He was ordered sulphate of quinine, grs. 25, to be taken in divided doses during the night, and sulphate of morphine, gr. 1. The next day he was entirely free from pain, and his temperature was normal. The quinine was kept up in smaller doses during the day, and grs. 20 were ordered to be given on the following day about two hours before the paroxysm had usually occurred, with the result that he escaped the usual attack. Quinine, grs. 5 t. d., and a mixture of arsenic and iron were taken for several months, after which he stopped the medicine. In May last he had another attack which yielded to similar treatment, since which time he has enjoyed fair health.

This case presents two unusual features. First, both sciatic nerves were simultaneously affected, which, while it occasionally occurs, is far from common. Secondly, while malarial poisoning is a well-known cause of neuralgia of the trigeminal and intercostal nerves, most authors give it no place as a cause for sciatica; indeed Erb says: "All authors consider it doubtful whether it can be induced by malarial infection, as a typical example of sciatica is extremely rare in periodic fevers." On the other hand, however, Putzel says that the sciatic nerve is, next to the trigeminus, most frequently attacked. In spite of this assertion, while no doubt similar cases have occurred, I have been unable to find any report of one.—Medical Times, January, 1901.

Mosquitoes in Hong Kong during the Months of October, November and December, 1900, Examined and Reported upon by Dr. J. C. Thomson.

—In a report to the Government of Hong Kong Dr. Thomson summarises his examination of 3,539 mosquitoes examined as follows:—Of the total number 294, i.e., 8·3 per cent. were proved to belong to the genus Anopheles, of which two separate species were caught; and 3,245, i.e., 91·7 per cent., were of the Culex type of which seven species were identified.

	toes	Anoj	pheles.	Cul	ex.	Cases of Malarial Fever
	Mosquitoes	No.	Per Cent.	No.	Per Cent.	sent to Government Civil Hospital by Police
October	401	106	26.4	295	73.6	66
November	796	50	6.3	746	93.7	23
December	2,342	138	5.9	2,204	94.1	17
The three months	3,539	294	8.3	3,245	91.7	106

Dr. Thomson proposes to extend his inquiry over the whole of 1901, when an approximately accurate

classification of the mosquitoes prevailing in the Colony of Hong Kong may be obtainable.

THE NON-MALARIAL FEVERS OF THE TROPICS .- AS one result of the growing feeling of certainty in regard to the mosquito theory of malaria, and of the general recognition of the reliability of the indications given by the microscope in the diagnosis of the disease, it is probable that we shall before very long find a large increase in the number of separate and well-differentiated febrile maladies met with in Wherever any one particular disease greatly predominates there is a natural tendency among those who practice in that district to attribute to the predominant ailment any malady which has even the most superficial resemblance to it, and this has been markedly the case in regard to malaria. Malaria often presents anomalous features, and in malarious countries it is frequently found that strange and obscure cases clear up under quinine. the strong temptation to dub every fever malaria and every case of debility malarial cachexia; a temptation to which one can hardly doubt that many practi-tioners have given way. The result has been, on the one hand, much loss to many patients by time being wasted in unavailing efforts to cure them with quinine; and, on the other, much undeserved doubt as to the efficacy of quinine in consequence of this drug being used in cases to which it was quite inexplicable. There can be but little doubt that among the crowd of fevers which have been spoken of as abnormal cases of malaria, or explained as double infections overlapping one another, or united together as malarial remittents, a large number are not malarial at all. The efficacy of quinine has had the effect of demoralising the doctors in malarious districts, and this drug has seemed sometimes to have become the Alpha and Omega of all medical effort. Signs are not wanting, however, that the efforts of the large number of well-qualified men, who are now engaged in the investigation of tropical fevers-and are now able, armed with the microscope, to separate will throw considerable light upon this large question. By aid of the power they now possess of putting on one side most cases of malaria, they will be able to devote themselves to the task of differentiating the various diseases which make up the remainder, and we can hardly doubt that before many years have passed the subject of tropical fevers, hitherto so dominated by the ever-present intrusion of malaria, and obscured by the routine treatment by quinine, will have to be entirely rewritten.—The Hospital, February 2, 1901.

The Malarial Mosquito on the Susquehanna. By Harvey B. Bashore, M.D.—During the past summer I made some observations to ascertain the prevalence of the malarial mosquito (Anopheles) in this locality; namely, the suburb of Harrisburg. The conditions existing this season were, according to the popular notion, very favourable for malarial development—a low stagnant river and considerable hot weather. The recognition of the Anopheles is extremely easy with the aid of a small pocket lens; the characteristic points being the spotted wings, long "feelers," and resting-position. This resting-position,

although rarely at right angles to the surface, is at such an angle that with a little practice one is able to tell Anopheles from the position alone. Mr. L. O. Howard, the government entomologist, kindly verified the species for me. During the great heat-wave from August 14 to August 22 inclusive, while the temperature was ranging between 70 and 100 degrees F., mosquitoes were exceedingly plentiful and became a decided annoyance, even in the houses which were properly screened. During this period I captured and examined 540 specimens, of which 400 were Culex and only 140 Anopheles (133 being quadrimaculatus and 7 punctipennis); that is, only 25 per cent. were "malarial." During this time there was very little malarial fever; I saw, I believe, only one case of intermittent fever in my own practice. After the great storm in September, a cool wave spread over the region with the temperature in the morning ranging between 50 and 60 degrees F. During this period, although mosquitoes seemed very rare, I managed to capture 78, of which 56 were malarial—about 74 per cent. Then (hardly a mere coincidence) there was an unusual outbreak of intermittent fever; personally I saw twenty cases in ten days, mostly tertian, requiring large doses of quinine and showing a marked tendency to relapse later on. Late in September and at the beginning of October the Anopheles occurred only in the ratio of 50 per cent., and during this time there was a diminution of the number of cases of fever twelve in thirty days. In the month of October we had several severe frosts, and in the latter part of the month very fine weather, but Anopheles seemed to have gone into winter quarters, for only 16 per cent. of the mosquitoes belonged to that family; likewise the intermittent fever seemed to have vanished, for there existed hardly a case. In every instance the mosquitoes were captured in the same place—the back porch and an out-building of my own residence -and, although there was no fever in this house, nearly all my cases occurred within a few blocks of it. -Medical Record, February 2, 1901.

To ward off Mosquitoes.—A resident of New Jersey writes to the *Public Health Journal* to say that he wards off mosquitoes by applying to his face, hands, and other parts, every two or three hours, a mixture of one part oil of sassafras to five parts of alcohol. We are afraid that except when mosquitoes are very numerous indeed, few will care to avail themselves of this form of protection.

#### PLAGUE.

In Capetown plague has appeared and threatens to become serious. On February 26, thirty-one cases were stated to have occurred; on February 27, two fresh cases were reported in the city, and four of the "contacts" developed the disease. Several Europeans have been attacked, and cases of plague have been found some distance beyond the limits of the city. Viewing the extraordinary amount of traffic at Capetown at the present moment, both seaward and inland, the danger to Britain and the interior of South Africa is a matter of deep concern. Professor W. J. Simpson seems to be taking an active part in

the necessary steps to be taken in Capetown, and the Government of the Colony have superseded the Corporation of the city in all matters affecting plague. It is fortunate that Professor Simpson's experience and advice is available at Capetown during the present crisis; for not only as a sanitarian of eminence but also as a plague expert his opinion must be welcomed.

Bombay.—Telegrams, dated February 27, state that in the city of Bombay 400 persons died of plague

during the two previous days.

SINGAPORE.—Three cases of plague were reported at Singapore on February 25. This is the first time that acknowledged cases of plague have appeared in this Colony.

#### MISCELLANEOUS.

THE Japanese are a progressive nation in the broadest sense of the word. During recent years they have made huge forward strides. They have sent their young men to Europe to study medicine and law; they have founded universities in their own Their navy is equipped with all modern requisites, their army is beyond reproach, and their ambulance arrangements during the recent Chinese campaign have won the admiration of the European powers. In addition, the women of Japan are now being assisted to make a distinct advance. years ago the higher class Japanese women adopted European dress, and contact with the outer world has doubtless helped to "emancipate" them from the position they hitherto occupied; for in Japan as in other Eastern countries, ladies have been kept secluded, and their education has been of the most primitive description. A wealthy family of the name of Milsui, has presented a large piece of ground in Tokio as the site of a special university for women, and three generous citizens have supplied the funds about £24,000—for the construction of the necessary buildings. The promoters of this splendid scheme hope to inaugurate the new University for Women in the spring, and already an enormous number of young girls of good birth have made application to be admitted to the various courses which will include the study of medicine, civil engineering, &c., &c. In the course of a few years, therefore, the Japanese will have "Lady Doctors" in their midst, and who knows how soon we may not hear of Japanese Lady Dentists, electricians, and civil engineers.

MESSRS. HUMPHREYS, of Knightsbridge, London, S.W., are rapidly acquiring world-wide notoriety. In addition to having erected some hundreds of hospitals in the United Kingdom and abroad, this enterprising firm manufactured and shipped the buildings of the "Princess Christian" Hospital, as also the Scottish National Hospital and others for the soldiers in South Africa, and during the last six months they have supplied, on account of the War Office, over £100,000 worth of military hospitals and barrack huts for use by the troops at the front.

THE mosquito hut erected in the Roman Campagna, and inhabited by Drs. Sambon and Low and others during the summer of 1900 with a view of demonstrating the truth of the mosquito-malaria theory, was designed and manufactured by Messrs. Hum-The complete protection against malaria and mosquitoes afforded to all those who resided in this hut is a sufficient guarantee of the efficacy of such protection, and of the trustworthiness of Messrs. Humphreys' work.

HÆMOGLOBINURIA COMPLICATING TYPHOID FEVER.-Drs. John H. Mussie and A. O. T. Kelly, of New York, relate a case of typhoid fever in which hæmoglobinuria existed for at least seven days in a patient in which malaria as an ætiological factor was entirely absent. The patient recovered.

Messrs. Defries and Sons have received instructions to equip the Ophir with an installation of Pasteur filters, from which not only Their Royal Highnesses but also the whole of their suite will be These filters are of the ordinary type familiar in this country, and are fitted with special reservoirs to prevent any pollution of the filtered water. This is a high and well-deserved compliment to, and acknowledgement of, the efficacy of Defries and Sons' filters.

THE following table from the China Medical Missionary Journal, January, 1901, affords definite information of the extent to which the Chinese avail themselves of treatment in foreign (European and American) hospitals:-

HOSPITAL STATISTICS FOR 1899.

*		0	ut-patie	In-		
Location Mission		New	Old	Total	Pat.	Oper.
	July and October-		1.	400,264	16,304	14,133
Chingchow Foochow	E. B. M	7,294 	2,556	9,850 20,044 4,376	211 357 190	1,188
To	otal of 43 hospitals ar	d dispen	saries .	434 584	17.062	15,321

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## Motices to Correspondents.

1.—All communications will be acknowledged in the JOURNAL under the heading "Letters and Communications Received." Contributors who do not see their names in the list should communicate forthwith with the Editors or Secretary.

2.—Manuscripts sent in cannot be returned.

3.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

4.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

5.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the

Editors.

6.—Correspondents should look for replies under the heading " Answers to Correspondents."

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In order to meet the constant enquiry for addresses of respectable firms catering for the various requirements so difficult to obtain abroad, we give a list of names and addresses which we trust will be found useful to our numerous correspondents and subscribers.

### Original Communications.

THE LIVERPOOL SCHOOL OF TROPICAL DISEASES—ADDRESS BY SIR WILLIAM CHURCH.<sup>1</sup>

PROPOSED ENDOWMENT OF A CHAIR OF TROPICAL MEDICINE IN UNIVERSITY COLLEGE, LIVERPOOL.

(By our Special Correspondent.)

A SPECIAL meeting in connection with the Liverpool School of Tropical Medicine was held in the Council Chamber of the Town Hall, on February 12, to consider the subject of "Health and Sanitation in West Africa and in the Tropics," in the light of the researches of the three malaria expeditions of the School. The Chairman of the School, Mr. Alfred L. Jones, presided, and was supported by Sir William Church, the Lord Bishop of the diocese, Professor Boyce, and Major Ronald Ross. There was a large attendance, including Dr. F. W. Mott (London), many prominent merchants and shipowners, and leaders of the medical profession in the city. Letters of apology for inability to be present were received, amongst others, from Colonel Willcocks, commander of the late Ashanti Expedition, Professor Ray Lankester, and Professor G. Sims Woodhead.

The Chairman said that Liverpool merchants, and others who had connections with the tropics, had for many years been very much concerned and interested as to whether it was possible or not to introduce a better state of life for the people they had to send into those parts of the world, and also for the native population. It had occurred to the Committee of the School that there were possibilities in this direction,

Sir William Church, who was received with hearty applause, said that two years or so ago they asked him to be present at the inaugural gathering of the Liverpool Tropical School of Medicine-a gathering which was in every sense representative both of science and medicine, and of the commercial activity of Liverpool, Manchester, and other great industrial centres. Everyone who was present on that occasion must, he thought, have been struck as he was with the enthusiasm with which the idea had been taken up. It had been taken up by members of his own profession in this great town, and also by leaders of the commercial interests of the place; and one could not help feeling that the promoters of the movement at all events meant business, which was proved, he thought, and also the wisdom and energy with which the movement had been carried on were proved, by

and it had occurred to them that the past had been notable for the neglect and for the want of interest in tropical diseases. It had been evident that while we had been studying at home all kinds of disease, we had forgotten to some extent the cause of our fellow countrymen who had had to go to other climates to seek their living and to try to make the commerce of the world. He wished to pay a high tribute to a late member of the expedition sent to the Brazils, Dr. Myers, who had gone out solely in the interests of science and humanity. While at Para he contracted yellow fever, to which, unfortunately, he succumbed. The Committee, thinking what they could do to perpetuate his memory, had decided to place a memorial plate in the hospital at Birmingham, and to erect a gravestone in the churchyard where he lies buried in Brazil. He was glad also to be able to announce that a Chair of Tropical Medicine was to be endowed in the Liverpool University College, to be called the Walter Myers Chair.

<sup>&#</sup>x27; Meeting at the Liverpool Town Hall.

the results already obtained. It was perhaps too soon to speak of any fruit having been gathered in the shape of commercial profits, but already there had been a notable increase in the amount of our knowledge of malaria and other tropical diseases. He thought he could in a few words assure them of the wisdom of the movement. Going back to olden time Bacon had said in one of his axioms, "It is madness to suppose that that which has never yet been done can be accomplished except by using untried means." Now the School of Tropical Medicine in Liverpool had in a certain sense made use of untried He thought he might say it had been the first to send out properly educated and suitable missions to study the health and sanitation of tropical climates and their diseases on the spot. Of course they might say that the Government had at times done something of the sort. It was quite true that Government had on several occasions sent out missions, such as the Leprosy Mission and the Plague Mission, but they had differed—and differed very materiallyfrom the expedition that the Liverpool School had sent out. They went out to obtain evidence, to hoard it and sift it, and to collate it; and from the varied experience of different individuals to try to arrive at some useful conclusion. Now in his opinion the Liverpool School of Tropical Medicine had wisely determined early to send out expeditions to study diseases upon the spot. Already in their records they had shown that no fewer than three expeditions had been despatched to West Africa, and a fourth expedition was now engaged in studying the no less dreadful foe to his mind, namely, yellow fever, in its own haunts. It was perhaps too early yet to venture to say much as to the results from the medical or scientific points of these expeditions. But as he had previously said, much had already been accomplished. There was a very old adage that "Knowledge is power;" and power as they all knew, whatever form it might take-whether manual, steam or electric -was dependent on the exhibition of forces that somehow or another had been accumulated. Now one of the forces which tended to the progress of the world was the force of accumulated knowledge-the garnered stores of the numerous generations which had preceded us. Another form of power or force was that of accumulated wealth, riches and money. The search for knowledge was arduous. It required untiring patience and unwearying labour, and an expenditure of material wealth, and even more than that; for although it required the sinews of war in the shape of money it also needed great patience, toil and suffering, not to speak of loss of life. They had all heard of the great sorrow among the band of workers through accidents that happened, and loss of health and life. They now had to deplore the loss of one whose life promised to be unusually bright and useful to mankind-he alluded to the death of Dr. Walter Myers. But his life had not been wasted. His sad experience had taught them that this loss was only part of the price which must be paid if they were to endeavour to unfold the secrets of nature. Just as in the search for material wealth, so in the search for knowledge, it had always been the case that life had been sacrificed; and so he feared it would

always be. Apart from knowledge, however, it was quite evident that considerable if not large sums of money would be required to keep up the excellent hospital which the Liverpool School had already founded, and which by the report he saw had already done good work. In his opinion, however, still more help was wanted to continue these expeditions, which had already done much to increase our knowledge of disease, and which, to his mind, were the surest and best means to enable us so to improve the health and sanitation of tropical climates that they might not be as dangerous as they now were to the lives of Europeans. It had been computed by extremely able men that the mere cost of the machinery of carrying on the government of such places as our West Coast Settlements and other malarious and unhealthy districts was more than double that in other parts of the world—in other words, it took two men to do what might be and ought to be done by one. Enforced absence had to be taken into consideration. If they were to lessen, even by one half, the expenses of the Government, even, say, the expenses from mortality and invalidism of these countries, how great would be the increased volume of our trade from these sources! There was reason for thinking that many of them were the richest countries on the face of the globe, so that he thought an investment of money in these places would not in the long run turn out to be a bad one; and he thought that the profit, even looked at from a commercial side, would be such as would amply repay the original investment. He therefore, not only in the cause of science and humanity, but even in that of the commercial prospects of this country, hoped that means might be found by which the Liverpool School of Tropical Medicine might continue to extend the scope of its work which had been so very successfully begun.

Major Ronald Ross described briefly the scope and results of the expedition sent to West Africa. After mentioning the places visited, he dealt with the observations of the members of the first expedition from a sanitary point of view. The water supply throughout the country, he said, was the best obtainable-rain water. All other sources of supply were contaminated by the natives. It was feared that through neglect of the precaution of boiling the water during the dry season some cases of disease arose which might be prevented. The houses of European Government officials were generally well situated, but those of the various trading companies were usually placed on undesirable sites-often in low-lying districts in close proximity to swamps, and more particularly to the crowded huts of the natives. As to the conservancy system, the method adopted in most places was admirable, but in a few others considerable improvement was desirable. Throughout the whole country the question of food supply was a very difficult one, and a supply of meat and vegetables from England-preserved by refrigeration or some other method -would be of inestimable benefit. Regarding European habits, there was some tendency to excess both in eating and drinking, and the nature of the climate of the country did not inspire one to take exercise. After a visit extending over a period of eight months, and covering a large extent of the

country of Nigeria, the members of the expedition had been able to arrive at the following definite conclusions as to how malarial fever could be best prevented in the districts they had visited:—(1) Living apart from the natives at a distance of about half a mile. This they had arrived at from a consideration of the habits of the mosquito of the genus Anopheles, and from the examination of the natives. Native children to a very surprising extent had the parasites of malarial fever in their blood, and the mosquito mentioned conveyed the disease from the infected children to Europeans living in the neighbourhood. (2) The efficient surface drainage of the areas round European quarters. This measure alone, without the application of the previous one, would not be efficient, but combined with it the two together would secure complete freedom from the disease for Europeans.

The Lord Bishop, referring to the beneficial results of the application of science to tropical diseases, said they were of a threefold character. First, there was the expansion of trade, and the expansion of trade meant the employment of a far larger number of our countrymen and men of other nations in giving to those nations of Africa commodities which they did not at present possess. Secondly, it meant the extension of knowledge. The confines of knowledge were being, so to speak, pushed back, and new provinces and new empires were being annexed in which those who cared to study the races and languages and manners and customs and many other such things would find a wider scope than they had ever found before. And last, and not least, it meant the advance of Christian civilisation.

Professor Bryce spoke of the wisdom of the Committee of the School in sending out expeditions to study the causes of diseases on the spot, and said the results of those investigations were now finding their way into medical literature, and would soon, no doubt, become classic. He paid an eloquent tribute to the late Dr. Walter Myers, whom he had personally asked to join the expedition to Brazil. He hoped that before long there would be an endowed Chair of Tropical Medicine to the memory of Dr. Myers, and that there would also be scholarships connected with it.

### SOME NOTES ON BLACKWATER FEVER, MORE ESPECIALLY IN REGARD TO ITS CAUSATION AND TREATMENT.

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THERE are three prevailing theories concerning the cause of blackwater fever, all of which have their advocates. These are: -(1) The quinine theory with various modifications; (2) the malarial theory; and (3) the theory that the disease is one sui generis having no necessary connection with either malaria or quinine.

The exponents of the quinine doctrine do not agree among themselves as to the exact manner in which the drug exercises its baleful effect. Some, now probably the minority, assert that quinine is the sole and only cause of the hæmoglobinuria which at times complicates malaria fever. These base their belief on the established fact that in some rare cases the administration of quinine, even in small doses, is invariably followed by the appearance of hæmo-That such cases do occur is, I suppose, globinuria. undoubted, but surely they should be regarded as examples of a special idiosyncrasy, when it is known that thousands of people daily take quinine without any such evil effects.

Others hold less hostile views of the drug, but at the same time assign a certain share of the evil to its These state that hæmoglobinuria is caused by quinine acting in conjunction with the malarial parasite; but that either of these factors by itself will rarely produce the condition.\* On what foundation does the theory rest which acribes a causal relation between quinine and hæmoglobinuria? Omitting the cases of idiosyncrasy above referred to, in which the administration of quinine always results in hæmoglobinuria and which prove nothing, there remains only the fact that in the great majority of cases of blackwater fever there is probably a history of quinine administration shortly before its onset. Is this a matter for surprise when we consider the fact that 90 per cent. of the cases of malaria occurring among Europeans are treated with quinine? It is difficult to find a case of malaria in a European which has not been so treated to a greater or less extent, and yet after all it is but a small proportion of these cases which end in blackwater fever. But this is not all, for amongst the small number, the 10 per cent. who are not treated with quinine, among these a certain number develop blackwater fever, and, what is more, a larger proportion than among the 90 per cent. who do receive the drug. Why therefore should we attribute to quinine a malady which may develop whether the drug is taken or not?

I have myself during eight years in East Africa treated many cases of malaria. At all times and increasingly of late years I have relied entirely on quinine in large doses. During this time I have never seen a patient develop blackwater fever while under careful treatment. In my own personal attacks, five in number, their severity has been in direct proportion to the extent to which I had

through carelessness neglected quinine.

As showing that there is no special idiosyncracy in my case, I might mention that in my youth, while living in Bechuanaland, South Africa, I was treated largely with quinine for the simple malaria of that country. Further, during the intervals between my attacks of blackwater fever in this country, I often suffered from most severe malaria for which I took large doses of quinine. On one occasion, ten months after my first attack of blackwater fever, I was troubled with severe and persistent malaria. My services were urgently required for an expedition, so I adopted heroic measures, taking in several doses 100 grains of quinine on each day for two consecutive days. For a week longer I took 50 grains a day, and then gradually reduced the dose until the end of a fortnight. The results are interesting. No hæmo-

<sup>\*</sup> Plehn, "Tropical Anæmia," Journ. Trop. Med., No. 18, vol. ii., January, 1900.

globinuria resulted, malaria disappeared, and for seven months I enjoyed better health than I had ever done before in the country. The possibility of post hoc sed non propter hoc appears to me to have been overlocked by those who hold the quinine theory in any shape or form. After long and extensive malarial experience I am bound to say that in my opinion it is an utterly erroneous and mischievous doctrine.

Before proceeding to the malarial theory, I will just shortly refer to the third one mentioned which regards blackwater fever as a distinct disease. The arguments which have been brought forward in support of this view are mainly negative, no positive evidence having been adduced in its favour. geographical distribution of the disease, the absence or scarcity of the malarial parasite, its analogy with Texas fever, such are the main arguments of those who hold this view. Others have pointed out that, in places where malaria and blackwater fever occur, the maximum prevalence of the latter does not coincide with that of the former, and that therefore it cannot be a malarial disease. The first and second arguments are more or less explainable even on the malarial hypothesis; while the third, based on analogy, does not bring much conviction unless supported by other facts. In regard to the fourth argument, it appears to me illogical. Everyone will admit that there is such a thing as malarial neuritis, and no one would deny its malarial origin on the ground that its prevalence did not correspond with that of malaria. We do not know what the exact conditions are which cause malaria to produce a neuritis in one person and not in another; but certain it is that a hundred cases of malaria may come under observation without one of them showing signs of neuritis, while among the next twenty cases there may be more than one example of the condition. In the same manner, if hæmoglobinuria is, as I believe, merely a complication of malaria, there is no reason why it should necessarily occur more frequently when malaria is most prevalent. conditions which lead to its development are absent, hæmoglobinuria will never occur however rife malaria may be.

There remains now for examination the malarial theory which states that blackwater fever is nothing more than a more than usually intense infection by malaria. Expressed thus the theory is open to a very grave and apparent objection. We know that some attacks of malaria, so severe as to end fatally, may run their whole course without any signs of hæmoglobinuria. On the other hand the latter appears often during malarial attacks of mild or at any rate medium severity. It cannot therefore be said that the occurrence of hæmoglobinuria bears any strict relation to the degree of the malarial infection, though it should be remembered that different individuals vary in regard to the extent to which they react under the influence of malarial poison, and the intensity of the symptoms are not invariably in direct ratio to the number of parasites observed. The objection, however, holds good and we must admit that an intense isolated malarial infection cannot be the sole cause of hæmoglobinuria. If, therefore, it is a

malarial manifestation, it must be regarded as a complication of the disease which only supervenes if the necessary conditions and causes which lead to it are present.

Regarded in this light the malarial theory appears to me sound and free from manifest objection. The question now arises, is it possible for us to discover what those conditions and causes are which lead to so serious a complication? In my opinion there is no doubt that to produce the result both the condition and the cause are generally essential. Either one

without the other is probably harmless.

And first in regard to the condition which favours the development of hæmoglobinuria. Amongst whom does it most frequently occur? It is well known that the disease does not often attack newcomers. As a rule the subjects of it are those who have been some time in the country and who have suffered to a greater or less extent from malaria. In some cases this is not so, and a patient may develop hæmoglobinuria during his first attack of fever, especially if he has been some time in the country. these circumstances the probability is that he has been suffering from latent malaria without being conscious of the fact. Plehn+ regards the production of the predisposition to hæmoglobinuria as due to the influence of the "primitive forms" which he describes, and which he affirms are capable of living and multiplying in the blood for long periods without producing any effects beyond a certain amount of This may be so, but personally, being unacquainted with the primitive forms, I have always ascribed the anæmia and the predisposition to b'ackwater fever to the effect of the plasmodial parasites causing either acute or chronic malarial attacks. I have long held the view that probably a certain number of parasites, possibly a varying number in different individuals, are necessary in each case for the production of a manifest malarial attack. If the parasites are not sufficiently numerous no actual attack will occur, but the patient suffers nevertheless a certain amount of injury. In this way a chronic infection may exist without the patient's knowledge. Whether in this way or by a series of acute attacks a condition is at last produced which favours the occurrence of hæmoglobinuria, if the exciting cause is provided.

Plehn, as stated above, adopts this view of the production of a predisposition, but ascribes it to the "primitive forms" which at length bring about a state of things in which "... the blood-building organs are at last incapable of regenerating enough blood to meet the unusual and persistent demand brought about by the continual dissolution, and finally yield in part a defective supply" (the italics are mine). Whether caused by primitive forms or by the plasmodium, a time comes when a certain number of corpuscles are deficient in stamina, if I may call it so, and this is what I would call the cendition necessary for the production of hæmoglobinuria. Now, given the condition, what are the exciting causes? In some cases it is possible that a severe attack of malaria will in itself be sufficient, but, as a rule, I believe something more is required.

<sup>†</sup> Plehn, loc. cit., Journ. Trop. Med.

In my experience, the exciting cause is generally a chill during a certain stage of a malarial attack when the parasites are in active development. It is important to note that I say in active development. Everyone will admit that a chill, in a malarious subject, is one of the surest ways of stimulating the ordinary disease into activity, but I hold that for a chill to produce hæmoglobinuria the parasite must be actively developing, in other words, it is a chill acting on an already present attack of fever, but, what is most important, only at a certain stage.

I am aware that many observers share with me the view that a chill is in some way connected with the production of blackwater fever, but I have not yet seen the fact pointed out that, for the chill to have this effect, it must act at a certain stage of the malarial attack. Further, I have not seen any explanation offered as to the manner in which the chill

so acts.

My theory on the subject is as follows:—Blackwater fever is a complication of malaria only produced when the blood glands have lost their normal regenerating power, either through the influence of malaria or any other constitutional cause. It is then caused by a chill acting on the surface of the body when the malarial parasites are in active development some hours before their sporulation. The effect of the chill is to cause a determination of the parasites to the deeper organs at a time when they should be in the peripheral circulation, and as a result sporulation takes place prematurely and there is a sudden death of all parasitic-bearing corpuscles.

The latter part of this theory dealing with the manner in which the chill acts is of course pure speculation, though there are facts which support it. In regard to the main point, the influence of chill at a certain stage, my opinion is based on practical experience so often repeated that it is impossible to regard it as coincidence. It remains to discuss the various aspects of the disease and to observe, how far

they are explainable on the above theory.

(1) Parasitology.—It is unfortunate that we seldom are able to examine the blood until after hæmoglobinuria has set in. This fact in itself is an argument in favour of the theory, for it amounts to this that if a patient is kept warm in bed under treatment he will not develop blackwater fever. By the time the condition is established it is generally too late to look for parasites. The mere presence of the hæmoglobinuria shows that there has been a tremendous mortality of corpuscles, especially those infected. At times parasites are found, and these are the malarial. I have only once had an opportunity of examining the blood prior to the onset of hæmoglobinuria. In this case the patient was a black boy, who is the only example that has come under globinuria. my notice of a native getting blackwater fever. He came to the dispensary one morning complaining of His temperature was 104 degrees F., and I was further struck by the fact that he was fearfully jaundiced. Being a native I did not think of blackwater fever, so giving him a dose of calomel and 20 grains of quinine I ordered him to go to bed. Needless to state he did not carry out my instructions, and that night he was attacked with blackwater fever. At the time of his first visit I had taken a

specimen of his blood and found it swarming with parasites. Early next morning he was admitted to hospital, but I could not find a trace of parasites. He was treated with hypodermic injections of quinine

and in three days was convalescent.

For some reason the parasites disappear directly hæmoglobinuria ensues, whether quinine be given or not. How is this explainable? I think I am right in saying that most authorities agree that quinine does not act on the more developed forms, and when these are present in the blood the administration of the drug will not stop that attack of fever, though

it may prevent the next.

If then the parasites—the sporulation of which brings on the attack of fever which is complicated by hæmoglobinuria—if they sporulated naturally we should expect to find a new brood in the blood. This we only exceptionally do, and this is the experience both of those who give quinine and those who do not. This fact appears to me to favour the idea that the brood, the sporulation of which produces the black-water fever attack, aborts, and for this reason few parasites are found and the disease tends to a spontaneous cure. I have long noticed that it is during the apyretic stage that a chill is dangerous, and it is interesting to note that this is the period when the parasite is as yet immature. Stephens and Christophersi state that the time taken by the tertian parasite to develop from the smallest to the largest size is about eighteen hours, while the remainder of the time is passed in the internal organs. There must be some reason for this varying distribution, and it does not seem unreasonable to suppose that any cause which drives the parasite into the internal organs at a time when it ought to be circulating in the peripheral blood, might lead to a deviation from its ordinary method of development.

In this way I would explain the influence of a chill on the body surface. By a chill I mean any influence which may lead to a lowering of the surface temperature. The patient may not be conscious of it, for this effect may be produced by simply sitting lightly clothed in a more or less draughty room.

(2) History of onset.—The history of the beginning of all attacks of blackwater fever show a painful similarity. With one doubtful exception all the cases which I have seen or received notes of have come on in exactly the same way. I have carefully noted the accounts of published cases, and where the history of onset is given it is usually the same. Dr. Hanley, § of the Niger Coast, states that he has never seen blackwater fever develop if a patient is kept in bed and given quinine, and my own experience is identically the same.

The usual history is as follows:—The patient has had fever more or less severely, but feeling himself better he gets up and goes about his duties. A few

hours after hæmoglobinuria comes on.

In my own personal attacks the history was the same. By the time my third attack came on I had learnt the lesson, and ever since have been scrupulously careful to avoid leaving my bed until

<sup>†</sup> Reports to Malarial Committee Royal Society, 1899-1900. § Hanley, Journ. Trop. Med., vol. ii., No. 16, November, 1899.

my temperature was normal. In the case of my fourth and fifth attacks I was forced to break this rule owing to urgent medical duty. On both occasions I did so fully conscious of the risk I was running, and in a few hours my fears were realised. Some patients will state that they have had no immediate antecedent fever attack, but they will admit that for several hours before they were feeling very seedy, though probably up and about. In these cases no doubt the temperature had been over normal for some time.

The history of onset therefore is distinctly in favour of the view that the disease is caused by a chilling of the body surface during the early part of

the life cycle of the parasite.

(3) Clinical Course.—There is, in my opinion, little difference between the course of blackwater fever and an ordinary severe attack of malaria, if we except the presence of hæmoglobinuria, and the fact that blackwater fever tends to a rapid and for the time permanent cure. The initial rigor is often quoted as an invariable symptom of blackwater fever, while in the ordinary malignant tertian it is usually absent. I have known several cases of blackwater fever where there was no rigor, while on the other hand I have noted that in ordinary malaria the sign is not uncommon, especially if the patient persists in walking about and exposing himself after the attack has The severe vomiting is certainly more characteristic of blackwater fever, but in some cases it is not more marked than it may be in any malarial attack. Suppression of urine and nephritis are, of course, symptoms secondary to the hæmoglobinuria, and cannot be brought forward as arguments against the malarial origin of the disease, especially as they may occur in malaria even when uncomplicated by hæmoglobinuria.

The main point in which blackwater fever differs in its clinical course from an ordinary malarial attack is in its tendency to spontaneous cure, and this is entirely in harmony with the theory under consideration. The abortion of a whole brood of parasites clears the system more or less entirely of all malarial parasites. If the violence of the poison generated and the resulting hæmoglobinuria do not kill the patient he speedily recovers. Sometimes the extirpation of the parasites is complete and the patient survives his blackwater fever free from all malaria.

It is a most striking fact, and one which I have noted frequently, that often a patient who has been tormented with malaria will, after an attack of blackwater fever, enjoy for a long period the most perfect In other cases some parasites escape the general destruction, and even though the hæmoglobinuria subside, fever may continue for many days. In these cases probably the original parasites were of different ages, and only the more mature ones aborted. It may be asked how, if this theory of the pathology of the disease is correct, it explains the fact that the hæmoglobinuria may continue for several days. Granted that one brood of parasites have aborted owing to being disturbed by the chill, why should their successors, who were not at the right age to be affected, why should they also abort later on when the patient is warm in bed? This is certainly a difficulty, but we know that a vicious

practice once started tends often to continue. In favour of this view we may note the fact that once a man has had blackwater fever he is very apt to get it again later on. The continuance of the hæmoglobinuria may be explained by the supposition that the amount of hæmoglobin set free varies in different cases, and that therefore the length of time necessary for its total elimination varies. I had a case not long ago which illustrates this. instance the temperature dropped to normal fortyeight hours after the onset of the blackwater fever. During this period the kidneys had not been acting at all well. On the third day, although the temperature was normal, hardly any urine was passed, and what there was remained black. The condition continued until the fifth day when the patient died of heart failure. The last forty-eight hours he only passed about two ounces of hæmoglobinuric urine. The temperature after the morning of the third day never exceeded 99 degrees. I could not help thinking that in this case death was caused by a blocking of the kidney tubules which rendered the excretion of the free hæmoglobin impossible. I should doubt whether any hæmoglobin was set free after the temperature fell to normal, but owing to the excessively small amount of urine passed the original hæmoglobin set free in the blood persisted until the fifth day. Had the kidneys acted well during the first forty-eight hours, probably the circulation would have been cleared of all free hæmoglobin by the time the temperature fell to normal. I may mention that I did not reach the patient till the second day, and up till then he was untreated. He had also had an attack lasting two days only a fortnight previously. In spite of suppression of urine there were no signs of uræmia, convulsions, or coma. His heart, however, became enormously dilated and he died suddenly of cardiac failure.

(4) Treatment.—Acting on this view of the causation of blackwater fever what are the indications for treatment? First in regard to prophylaxis our aim should be to try and prevent the onset of the condition which favours its occurrence, and for this purpose we can only rely on quinine and general anti-malarial measures. The first thing to do, of course, is to avoid infection, but this under some conditions is impossible, and therefore quinine should be taken, at least 5 grains daily. In regard to quinine prophylaxis, to be effective the drug should be taken before infection is possible. That is to say, the daily dose should be started before entering the malarious country. Once a patient is infected the consumption of 5 grains quinine a day will not necessarily prevent the parasites from causing a malarial attack sooner or later. If a malarial attack has occurred the further use of 5 grain prophylactic doses is more or less useless, unless the parasites are eradicated from the system, and this we can only hope to accomplish by large doses of quinine continued daily for at least a month. After that we can again rely on the small daily dose.

If in spite of all precautions malaria develops, the most scrupulous care should be taken to avoid chill or exposure in any shape or form, especially during the apyretic periods of the attacks. No man who has suffered much from malaria, or who has been

some time in the country, should ever leave his bed unless his temperature has been normal for at least twenty-four hours, and even then he should treat himself as an invalid. It is difficult to get patients to carry out this régime in tropical countries. Familiarity with malaria breeds contempt and often they get into the habit of treating themselves even if a doctor is available. The idea of lying in bed with a temperature of 99 degrees appears to them absurd. So long as these sort of ideas prevail, so long will blackwater fever claim its victims, and it is our duty to warn patients solemnly of the risks they run. It does not follow that every time a man leaves his bed with an elevated temperature that he will develop blackwater fever, but we never know when the exact condition has been reached in which exposure will produce this alarming result. It is therefore better to err on the safe side and to treat every case as one of potential blackwater fever. A thermometer in a layman's hands is not an unmixed blessing, and continual sucking of that useful instrument is apt to lead, especially in newcomers, to a somewhat hysterical frame of mind; but I think every man ought to have one, and should be taught how to use it. Amongst newcomers the danger of blackwater fever is less. It is more especially those who have developed the conditions which favour the occurrence of the disease who should be warned. This means those who have suffered a great deal from malaria or those who have lived for a long time in malarious Directly any feelings of fever (and all old residents know them only too well) come on, the temperature should be taken, and if only raised half a degree the patient should get to bed at once. I firmly believe this simple rule would stop many a case of blackwater fever.

Now as to active treatment when the disease has developed. The great question is, shall we or shall we not give quinine? Personally I have invariably done so, and with so much success that I dare not take the risk of experimenting without it. fully aware that blackwater fever at times does cure itself entirely without the aid of quinine. In these cases the destruction of the parasites has probably been complete, but how can we always be sure that this has occurred? We cannot trust entirely to the microscope, for those parasites remaining may be so few as not to be detected. The following day they may have increased and we shall have lost valuable time. A man who has hæmoglobinuria is not in a good position to fight any more parasites and he may die, not from the initial hæmoglobinuria, but from a superadded malarial attack. I think, therefore, quinine should always be given not to cure the hæmo-globinuria but to kill off any remaining parasites. I had one case, and several others have been reported to me, in which the hæmoglobinuria subsided after forty-eight hours, but severe fever of a remittent type followed for ten days. Unfortunately in this case I was not able to examine the blood. The case was treated all through with quinine, but it was only after heroic doses that the temperature fell to normal. Such cases are always risky, and to avoid subsequent fever quinine should be given freely as soon as ever hæmoglobinuria shows itself. I cannot think that it acts injuriously, for all cases which

occur amongst the officials in this administration are treated in this manner, and so far the mortality has been wonderfully low.

Owing to the gastric irritability the quinine, and in fact all medicants, have to be administered hypodermically or *per rectum*. I prefer the former method, not only because it is more certain, but also because we require the rectum for purposes of alimentation, and it is as well to irritate it as little as possible with medicines.

I need not refer to other details of symptomatic treatment, but there is one important indication which must not be lost sight of. What we should endeavour to do is to assist the elimination of the free hæmoglobinuria as quickly as possible, and at the same time prevent blocking of the kidney tubules. To attain both these objects the patient should be encouraged to drink freely of all such bland liquids as soda-water, barley-water, rice-water, weak tea, &c. In this way we flush the kidneys and assist the excretion of the hæmoglobin. It is true that as fast as the patient drinks he will vomit again, but even so a certain amount of the fluid imbibed will be absorbed. The free drinking has another beneficial effect. The vomiting continues whether the stomach be empty or full. In the former case painful retchings result which are most exhausting to the patient, so that for this reason alone I think free drinking is beneficial.

The theory put forward is I am fully aware more or less fanciful, but in its main point it rests on the solid ground of practical experience; at any rate it affords a basis of some kind for rational treatment and prophylaxis. A provisional working theory is better than none at all, and it in no way interferes with further research in the matter. Possibly it may be proved before long that the true pathology of the disease is entirely different. In that case I feel confident that chill will be found to be one of the exciting causes whatever the nature of the disease may be.

# A CASE OF BLACKWATER FEVER.

A MEDICAL OFFICER RELATES HIS OWN ATTACK.

[We are indebted to Dr. Patrick Manson, C.M.G., F.R.S., for having forwarded this interesting paper.]

Previous History.—Never to my knowledge have I had an illness of any sort previous to joining the A.M.S. in May, 1885. I served in India, September, 1885, to December, 1890, chiefly in Lower Bengal and with Upper Burma Field Force (1886-87).

Most of the stations in which I was quartered were highly malarious, and though I only suffered from fever twice, at Pagan, Upper Burma, and Mandalay, each time without cold stage and cured by quinine, I felt very ill before the tour was completed. On my return to this country I was posted to the Curragh, where I served from January, 1891, to November, 1893. For the first few months I improved greatly, but in December, 1891, I had a very severe attack of influenza—nervous form—followed by severe bronchitis which lasted about five months, and then asthmatic attacks which at first occurred twice a day at regular hours as if influenced by malaria. Suffered from two

other bad attacks of influenza in 1892 and 1893, and was never entirely free from the asthmatic attacks (antipyrin relieved these more than anything else).

Embarked again for India November, 1893, and was posted to Madras, January, 1894. Here the asthmatic attacks gradually disappeared and I had one sharp attack of influenza (doubtful, may have been malarial fever). Was moved to Rangoon September, 1895, where I suffered from frequent slight attacks of fever (without any cold stage). During the rains of 1896 became more and more debilitated, liver and spleen enlarged and was invalided home, March, 1897, having had one sharp attack of fever on January 7, which came on immediately after sitting up all night with a patient.

N.B.—Neither of these sharp attacks were preceded by a noticeable cold stage—before the first I had been taking no quinine, before the second I had been taking 10 or 20 grs. daily for at least two or three months. Nothing peculiar was noticed in the urine.

Returned to India again in December, 1897, and was posted to Belgaum, where I served until March, 1899. Had no actual attack of fever during this period, but felt the effects of climate very much.

Arrived home April, 1899, and served at Cork, Waterford, the Curragh, Irish Manœuvres, and Cork again. While at the Curragh under canvas in July, I was flooded out one night during a thunderstorm and the asthmatic attacks came on again. Mobilised at Aldershot November, 1899, and sailed for South Africa, December 9.

Served with 11th Brigade Field Hospital during the relief of Ladysmith and subsequent manœuvres to Elandslaagte until May 12, when I was transferred to Chieveley to charge of No. 4 Stationary Hospital. Moved with this Hospital by rail to Newcastle on June 4, up to which time, though I had had several asthmatic attacks and felt the variations of temperature very much, my health on the whole had been excellent—weight 13st. 2½lbs.

At Newcastle the weather was very much colder, with hard frosts at night and it was impossible to keep warm.

June 4th.—On arrival at Newcastle I slept the first night in a Dutchman's house which had been recently occupied by Boers, and about June 6th, a sickly looking kitten from this house found its way into my hut at night and slept on my bed. Next day I found I was bitten severely by insects of sorts over the left side of abdomen and also on the following night. Of course it may not have any significance, but this was the only time I was bitten by anything while I was in the country.

Prodromata.—On June 8, I noticed slight irritation in the urethra when passing water. On the 9th the same, and also felt very sick shortly after sundown. Felt half frozen during the night but got up usual time next morning (10th) and though shivering, ate breakfast and lunch as usual; continued to shiver all day and grew worse as sun went down. Could not eat dinner so took gr. x. quinine and went to bed.

First Attack.—Temperature about 7 p.m., June 10, 101.4°. The rigor continued some time after going to bed and the temperature gradually rose, reaching its maximum about midnight, but I was too ill to take

it—it was certainly over 103° and probably nearly 105° F. Sleep impossible, owing to severe pains in back (across sacrum) and legs; restlessness extreme, with a feeling of being bruised all over. Heart's action very rapid, breathing difficult, mouth dry and clammy. Headache, at first frontal and not very severe. Began to improve about 4 a.m., from which time these symptoms gradually abated.

time these symptoms gradually abated.

11th.—At 10 a.m., T. 101°. Tongue coated all over
—white at sides and brown in centre, large and flabby
and marked by the teeth. Bowels constipated,
jaundice slight. No vomiting, was able to take milk
and soda freely. Micturition frequent, about \(\frac{1}{2}\)i. at
a time with intense scalding; urine orange coloured,
becoming darker towards evening. Restlessness and
sleeplessness continued.

12th.—Easier, but scalding intense; urine dark, smoky, small quantity of blood passed at the end of the act from about midday; little sleep.

13th.—Felt much better every way except that the urinary symptoms continued the same. Quinine omitted and potas. bicarb. and hyoscyamus taken instead. Slept better.

Second Attack.—Was feeling so much better on 14th that I thought the attack could only be one of ordinary malarial fever, and as on the 13th went outside to the latrine tent about 11 a.m., but otherwise kept in bed. During the night, however, the pains, difficulty of breathing, &c., recurred, but not so severely as at first. No sleep. Temperature not taken, but probably over 102°.

15th.—T. 100.6° M., 101.4° E. Began quinine again, gr. x. three times. Urine much darker, with large flocculent deposit and what appeared to be a few thin clots. Very little sleep.

16th.—Cinchonised. T. 100° M., 98·6° E. Feeling much better, but for the urine. Slept better. 17th.—Ditto.

18th.—T. normal. Quinine reduced to gr. xv. with acid boric (gr. x. doses) and nux. vom. No blood passed in urine, which now changed to a reddish colour, with only slight precipitate; scalding and frequency becoming less.

19th.—T. normal. Urinary symptoms improving. 20th.—Urine clear. From this until 28th improvement was continuous. I had got on full diet, was able to be up from 10 a.m. to 9 or 9.30 p.m. Pain in the back, which had been continuous at first, gradually wore away, until on 28th I had absolutely none and I felt fit for duty. The tongue, however, never cleaned entirely, a brown triangular strip remained down the centre.

Third Attack.—June 28 was a cold cloudy day, without sun and foggy towards evening. I felt it considerably and remained indoors almost entirely. About 6 p.m. I went out for about one minute, and five minutes later began to feel chilly. Pain up the middle of sacrum gradually came on and the chilliness increased to rigor at 9 p.m., when I went to bed. Temperature then normal, but twenty minutes later 101°, and in half-an-hour 103·6°. All the symptoms of the first attack returned. I was too ill to take temperature during the night, but it must have been over 105°. The urinary symptoms returned, as shown in chart and I felt slight aching in both testes and cords.

Slight left epidydimitis on July 1, when temperature again became normal. Urine had a sweetish fœtid odour of beef-tea or beef-juice. The boric acid gave almost immediate relief and the urine was clear again on July 4. I felt much worse after this attack than after the other two, and emaciation was more marked.

On July 6 I was transferred by hospital train to Mooi River, being thus apparently convalescent. The tongue remained brown in centre and the pain in sacrum continued. Appetite nil, and I was unable for any sustained effort. I arrived at Mooi River about 11 a.m., July 7, and although there had been a heavy frost during the night, and I was chilled through in the early morning, I did not then suffer from a relapse. After arrival I kept carefully in bed all day except for an hour in the morning while the bed was being settled, and then I sat in the sun which was warmer than the ward.

Fourth Attack.—Without any apparent cause, about midnight on July 11, the pains in the back and legs returned with increased violence; I felt as if stretched on the rack. Temperature not taken during the night, was 99° on morning of 12th, when I felt easier. The urinary symptoms had returned, and though there was less irritation and pure blood, there was a great deal more deposit, in fact, for several days the stream was in about this proportion—

the first and last portions consisting of greyish flocculent matter, the centre being clear. I was now becoming rapidly debilitated and though the urine gradually became practically clear, my legs would scarcely support me going downstairs. I was still inane enough to go daily to the earth closet just outside.

Fifth Attack.—On July 21 the urine was absolutely clear and I was feeling much better. Sat in the sun in verandah from 11 a.m. to 4.30 p.m. in a long chair. That night I was on the rack again, not so bad as the previous attack, but next day, 22nd, blood reappeared in urine and E. T. 100.8°.

23rd.—Blood continued. Pain felt down both cords,

specially the right.

24th.—Blood continued. Was given two doses of ergot mixture in the evening, and during the night, excruciating agony is a mild term for what I went through. To the pains in back, legs and head of an ordinary attack, was added that of an acute and rapid right orchitis. About 4 a.m. I had to have a hypodermic of  $\frac{2}{3}$  gr. morphia. Temperature not taken, but about 11 a.m. on 25th, when I was much better, it was  $103^{\circ}$ . Urine dark brown, blood slight.

26th.—Urine the same. I was now absolutely prostrate, could only lie on back, could not read, converse or grasp subjects mentioned at the time. Head felt sore outside, specially sides and back, headache constant, but not very severe. Slept very little, never before about 2 a.m., and then very restless, being semi-conscious. Appetite absolutely nil. Feeling not exactly "despondent," for I never felt as if I

were going to die, but "not caring which." Emaciation was rapid, and irritability caused by noise of any kind excessive.

27th.—Feeling the same. Fair amount of glairy mucus in urine, streaked with blood, as well as the brown flocculent sediment. Temperature after this was normal and the urine improved slowly, becoming clear on August 1. Appetite remained nil, tongue flabby, brown in centre with white edges. Irritability, sleeplessness, and restlessness at night continued. Pain in the back also continued after this attack, and I found that it required the greatest effort to carry on even the shortest conversation or write a short note.

As on each former occasion a relapse had followed on getting up, I now determined to stay in bed for a longer period, although urged by others to get up and sit in the verandah. On August 6, the eleventh day of apyrexia, temperature fell to 96.2°, and remained subnormal until the ninth.

On the 18th I had an exacerbation of the pain in the back, and on the 19th the urine was rather high coloured, but otherwise I had been gaining ground slowly, was getting back on solid food, though digestion

was very weak.

Was transferred to hospital ship Simla, on August 20, and sailed from Durban on 22nd. Though exhausted when I reached Durban I began to feel better almost immediately, tongue was cleaning and appetite returning for the first time. On 23rd, we met rather a cold head wind and though I took all precautions against chill, slight scalding and aching in the testes returned on 24th.

Sixth Attack.—For the first time I felt a sharp pain over the liver, and lay up all day hoping the attack would pass off, but rigors commenced early in the morning of 25th while in bed and continued all day, temperature rising to 103.6 at 6 p.m. I was given quinine, gr. v. and antipyrin gr. v., which reduced it to 101.4 at 8 p.m. I also had a dose of calomel. All the symptoms—pains in sacrum and legs, difficulty of breathing, palpitation, &c., of the first attack recurred, but not with such severity. The urine was not so dark coloured and there was not so much deposit. Bowels were kept free with salines, two large loose motions being passed daily, bilious with large quantities of mahogany coloured material resembling in appearance the urine I had passed on previous occasions.

This was the mildest attack of the six. Anorexia and insomnia continued till September 5, on which date I began to get on deck again for a few hours daily; appetite then returned and I slept better, putting on flesh rapidly. Indigestion, pain in the back and weakness, continued. Slight scalding returned

from September 17 to 19.

Disembarked September 18, and since arrival have had no actual attacks of fever, improvement appeared to be continuous, though very slow. Digestion has been quite right since the beginning of December. Pain in the back at first improved, but never entirely disappeared, it was always worse after standing or walking, and appears to come on in exacerbations about every twelfth day, then gradually getting better (I was practically free from it on December 25 and

26, then January 6, 7 and 8, and January 18, 19 and 20). The tongue was varied in the same way, it was very nearly clean on the dates mentioned, and then gets coated down the centre again. Pains in the legs and restlessness at night also recur the same way. Exposure to cold aggravates all the symptoms, and since January 21 the condition appears to have remained stationary. There has been no recurrence of the scalding, and the urine has remained clear. I have put on a good deal of fat, bringing weight up to about normal, but a very moderate amount of exertion knocks me up.

BERI-BERI IN HONG KONG, WITH SPECIAL REFERENCE TO THE RECORDS OF THE ALICE MEMORIAL AND NETHERSOLE HOSPITALS, AND WITH NOTES ON TWO YEARS' EXPERIENCE OF THE DISEASE.

By R. MacLean Gibson, M.D., C.M., Edin.

During the year 1899 there were 428 cases of beriberi treated in connection with the Alice Memorial and Nethersole Hospitals. The numbers being greatly in excess of former years, it occurred to me that some useful purpose might be served if examination were made into the records of previous years and notes added as to personal experience of the disease during two years' residence in Hong Kong.

The Alice Memorial Hospital was founded in 1887, and the Nethersole Hospital in 1893; both are under the same management, and were built specially for the benefit of Chinese patients. The figures therefore deal essentially with the Chinese, though occasionally Portuguese, Japanese, Indians and Malays come for treatment. As the hospitals are free (with the exception that in-patients pay for food) the cases are drawn from the poorest classes, e.g., coolies, house-servants, workmen and sailors. When epidemic servants, workmen and sailors. disease is rife in the Colony such people suffer most severely, so from the records of the above hospitals a fair idea of the prevalence of beri-beri in Hong Kong may be gained. Dr. Manson, in notes on "Beri-beri in Hong Kong," says, "It was not until last year, when the Alice Memorial Hospital was opened, that the general medical practitioners of Hong Kong had a proper opportunity to see and study native diseases. and that we began to learn a little definite about our endemic beri-beri."1

In 1888 the Sanitary Board issued a series of questions to the local practitioners regarding their experience of beri-beri in the Colony, to which answers were sent by most of the medical men, while Dr. J. M. Atkinson, at present Principal Civil Medical Officer, and Dr. Patrick Manson, embodied their replies in short papers. The general facts elicited were that beri-beri was present in Hong Kong; that it had occurred among Europeans and Chinese; that many cases had come from outside the Colony; and that it was more prevalent in 1888 than 1887. Dr. Atkinson's report deals chiefly with the disease among the Show that beri-beri was known he writes: "The inspector in charge seemed quite familiar with the disease and informed me that it had been a common

complaint among these men for years past, but more men had suffered during the present year." Dr. Manson quotes the speech of an honourable member of the Legislative Council in 1887, in which the honourable member had said, "Beri-beri is unknown . . I never heard of it;" 4 opposed to this Dr. Manson asserts, "I maintain that this most dangerous disease is extensively prevalent in Hong Kong at the present moment." In the Government Gazette for 1888 reference is made to the first record of the disease in the Colony as having been made by Dr. Wm. Morrison in 1852 in the following words:-"Amongst the natives, dropsies assuming the character of beri-beri afforded the greatest number of deaths. Beri-beri has hitherto been regarded as a disease peculiar to Ceylon, and its appearance in Hong Kong excited some surprise." Later, in 1856, two were reported; in 1858 there was an epidemic in Victoria Jail (16 cases and 9 deaths); in 1860, 3 fatal cases in jail. During 1882 and 1883, Dr. Manson recognised cases in the Colony. From the above it will be seen that the disease was early recognised by the medical men at least as existing in Hong Kong. The presence of this disease in Hong Kong is a matter worthy of attention from a public health point of view, as it greatly affects the welfare of the Colony. An old resident at a public meeting in connection with a strike among the coolies is reputed to have said: "The prosperity of this Colony largely depends on the sturdy shoulders of the Hong Kong coolie."

#### NUMBER OF CASES.

Turning now to the number of beri-beri cases recorded in the out-patient and in-patient registers of the Alice Memorial and Nethersole Hospitals from 1888 to 1899 inclusive, the total is found to be 1,864; of these 1,547 were treated as out-patients, and 317 as in-patients. The average percentage for those years was 1.69; but in many years the percentage was higher. Thus in 1888 of 6,285 general cases, 140 or 2·23 per cent., in 1895 of 9,530 cases, 267 or 2·80 per cent., in 1896 of 9,303 cases, 205 or 2·20 per cent., and in 1899 of 11,954 cases, 428 or 3.58 per cent., had beri-beri. It will be observed from these figures that the percentage of beri-beri cases varied greatly from year to year, and notably the highest percentage was in 1899. In an article on "Beri-beri in Temperate Climates," the writer referring to China says, "There has evidently been a remarkable ebb in the disease in that country,"8 but this statement does not seem to accord with our experience in Hong Kong.

#### AGE OF PATIENTS.

The question of an age immunity is important. Referring to the ages of patients Dr. Wallace Taylor, Osaka, says: "The most susceptible age is from 16 to 28 or 32 (years). . . I have never met with a case under 12 years of age, and from extensive inquiry have not heard of a case under 11 years. Children appear to enjoy an absolute immunity from kakké. I have never met with a case over 63 years of age, and am informed that it very seldom occurs over 60, and never over 65." Dr. Manson considers that beri-beri occurs at all ages except early childhood

and extreme old age. 10 On investigation into the ages of beri-beri patients registered in the Alice Memorial and Nethersole Hospitals, we find that of 1,547 beriberi out-patients and 317 in-patients, the average age of the former was 31.47 years, and of the latter 27.98 years, and of the whole 30.87 years. From statistics it appears that of 1,547 out-patients, 203 or 13.12 per cent., were 45 years of age and over; and of 317 inpatients, 22 or 6.94 per cent., were 45 years and over, i.e., of a total number 1,864 having beri-beri 12.07 per cent. were 45 years and over. The greatest age recorded was 77 years, and 13 cases were over 65 years, that is, '69 per cent. of the total beri-beri cases. Records show that out of the same number of beriberi cases, 9 out-patients or 58 per cent., 15 inpatients or 4.73 per cent., that is, a total of 24 cases or 1.28 per cent., were 12 years of age and under. Thus while it is true that the majority of cases occur between the ages of 18 and 32, yet the fact that the youngest case is reported as 2 years of age, and the oldest as 77 years, seems to make it impossible to say that in Hong Kong there is an age immunity from beri-beri.

#### SEX.

The male sex is most commonly attacked, though among children girls appear to be more susceptible than boys, but it should be noted that to the Chinese mind boys are many times more precious than girls, and only rarely are boys left as in-patients in the hospitals. Puerperal cases occur in Hong Kong, but only one case has been noted among the in-patient obstetric cases in Nethersole Hospital. On enquiry at the "Tung Wah Hospital," in the resident house surgeon said that in his experience he had seen about a dozen cases in about as many years. Statistics give the percentage of male to female beri-beri cases as 95.72 to 4.28. The usual proportion of male to female patients in attendance is as 4 to 1.

#### OCCUPATION.

The majority of the male beri-beri out-patients belong to the coolie class, whose work is carrying loads of rice, coals, bricks, &c. They are young, strong men coming from Canton, Swatow, Foochow, Amoy, Singapore and the Straits Settlements; the greater number of whom are obliged to live in lodging houses. These lodging houses are far from being pure and healthy, even though the number of occupants is regulated by law. The next most frequently attacked, according to the out-patient register, is the carpenter, and in this connection it is interesting to see in the British Medical Journal the result of investigations at Atjeh, in which it is stated, "Beri-beri patients can infect certain localities, and persons in good health coming from districts wholly free from beri-beri and settling in those localities become subject to the infection. . . . Wooden structures retain the infectious product more than stone buildings."12 That wood left exposed may become saturated with noxious substances seems possible from remarks in the *Indian Lancet*<sup>13</sup> on the hygienic aspect of wooden pavement. A block of wooden pavement which had been exposed to contaminating influences was found to have been permeated as a whole with pollution; so it may be possible that in the cutting up

of old and new wood these carpenters become in some way infected by beri-beri poison. Then in order of frequency (out-patients) come the sailors from their close bunks, the sedentary tailors from vitiated atmospheres, and the cooks from smoky kitchens. The last class of importance is that of barber. "Aseptic Barbering"14 is the heading of a leader in which is expressed the suspicion that even in Europe the barber may have something to do with spreading disease. A glance at the heads of Chinese patients is enough to convince one, that skin disease at least, is often conveyed from one individual to another through the medium of the Chinese barber. It would be difficult to estimate to what extent diseases of all kinds are propagated through the barber in China. The luxury of an "aseptic shave" by an aseptic Chinese barber is still on the far distant horizon! Should beri-beri be proved to be contagious as infectious, as is most probable, the fact that so many barbers have the disease may be an important factor.

Among in-patients about equal proportions of those suffering from beri-beri are sailors and coolies, then follow in order carpenters, cooks, tailors and barbers. The large proportion of sailors is due to the fact that captains of vessels send their men to hospital as soon as they are found unfit for work, whereas the average coolie has no money to pay his rice during a prolonged stay in hospital.

#### EFFECT OF CLIMATE.

It has long been thought that beri-beri depends to a certain extent on the climatic conditions present in a country. In Hong Kong we have to deal with beri-beri as it occurs under tropical conditions. During the earlier months, January to April, and later months, September to December, of the year, the rainfall is small. . . . . To sum up my observations I conclude (1) that beri-beri cases are most frequent as a rule during the months of May, June, July, August, September and October; (2) that during the months of May, June, July, August and September the rainfall is greatest; and that (3) the temperature is greatest in May, June, July, August, September and October, or to put it generally, beri-beri is shown to be most prevalent during those months of the year in which the rainfall is greatest and the temperature highest.

### MORTALITY.

The mortality from beri-beri in Hong Kong for 1899 was 202, while in the immediately preceding years the number was only 160 to 170; but this increase in the total number of fatal cases is probably due to the greater number of people attacked than to an increased rate of mortality from beri-beri. Looking back over the years 1888 to 1899 inclusive, the percentage mortality appears to vary greatly from year to year. As a rule only severe cases ask to be admitted to Hospital and considering the state of patients on admission the rate of mortality seems comparatively small. . . . The percentage mortality is found to vary from 0.00 per cent. in 1898 to 46.15 in 1896. In the years 1888, 1890, 1891 and 1898 the percentage fatal was below 10 per cent.; in 1892, 1893, 1894, 1895 and

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1899 between 10 and 20 per cent.; in 1889 and 1897 20 per cent., and in 1896 it was 46:15 per cent. The average percentage fatal during years 1888-1899 inclusive, is probably a fair average mortality, viz., 15:45 per cent. Beri-beri appears therefore in some years to be a mild disease, which though causing great discomfort and loss of work yet results in little loss of life, while in other years the type is so virulent and the mortality so high that it is a disease to be dreaded. Many of the fatal cases had only been a few days in Hospital, having evidently been brought in a moribund condition. The majority of fatal cases were under forty years of age, making it evident that the young and strong man is most severely attacked.

BERI-BERI KNOWN TO CHINESE FROM EARLY TIMES.

Beri-beri is well known to the Chinese native doctors under the name (Keuk Hei, a term similar to the Japanese Kakké and meaning "breath in the In conversation with Chinese doctors and from their medical books, one learns their ideas on this disease. Beri-beri has been recognised for a thousand years and occurs chiefly in the southern provinces of China and the islands of the South Seas, but also in a lesser extent in North China. It is considered a dreadful disease, especially because its onset is so insidious that often before a man realises his danger his chest has become involved and then his case is well nigh hopeless. Men are warned to be careful as soon as they feel the movements of their legs less free, slightly prickly, numb, swollen and painful, bowels constipated, tip of the tongue affected and limbs and muscles inactive and weak. The six pulses are superficial, hard and full.15 By taking timely heed to those symptoms he may prevent the disease rising to his chest. One writer gives many varieties of the disease according to the prominence of certain symptoms, e.g., the disease with numbness, wind disease, &c. Another divides beri-beri into wet, dry and pernicious rheumatic beri-beri. The symptoms of wet beri-beri are swelling of legs, shining skin, dulness of the face. feeling of heaviness, distortion of taste sensation. pulse quick, soft and jerky. The symptoms of dry beri-beri, no swelling of legs but pain, pulse quick, soft and jerky. In pernicious rheumatic beri-beri the pulse is small, slow and soft, signifying anæmia and rheumatism; it may, however, be small and bounding or small and firm. The other symptoms of pernicious beri-beri are swelling of legs, cold sweating, laxity of bowel, loathing of food, sleeplessness, livid face and pale lips. Generally speaking, a case with swelling below the ankles is a mild case, on the legs a progressive case, on the thighs serious, in the abdomen dangerous and as soon as constriction of the chest is felt, the heart must be guarded. As it is possible, however, that beri-beri may be confounded with other diseases, a Chinese writer gives the following differential diagnosis:—Beri-beri and malaria have both the sensations of heat and cold, but malaria has the six systems deranged one after the other, while beri-beri has only a swelling of the legs; a patient suffering from paralysis is too weak to walk about and has no pain at all, a beri-beri patient, however, has tightness of skin and firmness of muscles. The rheumatic patient has great pain, which in a serious case runs

along the hands and over the body and will, after a long time, paralyse the thighs and the disease remains -unlike beri-beri, in which the pain is confined to the legs. The Chinese ideas of the causes of this disease are stated to be over-enjoyment of ease during early life, too much sitting, addiction to alcohol, relishing rice, accumulating bad humours or heat, and catching miasma in a foreign place which the patient has visited. In the south of China beri-beri is said to be prevalent in Spring and Autumn and the dampness is believed by all to be a great pre-disposing cause—but in the north of China, the people, by drinking alcohol to excess and a kind of milk whey, so damage the stomach and spleen that they cannot perform their functions and many are thus attacked by beri-beri. The Chinese themselves in treating this disease lay stress on three points: (1) change of residence, (2) change of diet, (3) medicine. (1) It is well known among the Chinese that if they are attacked by beriberi in Hong Kong their best chance of speedy recovery lies in going back to their native places and living there for a time. A case was mentioned to me where a patient of beri-beri symptoms appearing each year during several years, immediately returned to his country home, but last year (1899) he died just before setting out for the country. In cases where it is impossible to leave Hong Kong the Chinese doctors recommend the patient to leave the ground floor and sleep upstairs to avoid damp. (2) The usual change in diet is to take beans or potatoes instead of rice. Articles forbidden are salt, geese, ducks, pork, mutton, flour cakes, eggs and indigestible foods-tonic drugs, vegetables, fruits, melons, cold soups. They recommend drinking mulberry tea and the use of pine wood water for washing. Medicines given are (1) Purgative not tonic drugs; (2) Rice worms (which are in season twice yearly) eaten with leeks and orange peel; (3) Turtles (male animals are best) to be eaten with leeks, but after eating if there is pain in the stomach, cause two or three motions and cure follows at once; (4) Cochcow powder, betel nut, orange peel, ginger and cinnamon as a prescription. (5) Cut off on a lucky day a piece of skin from the patient's arms and legs. Then judging that a "mind diseased" may be prejudicial to the patient, he is directed to "minister to himself." Let beautiful things be in the heart; Let there be almsgiving and heart examination to the full, then will the disease not come. If it has come examine yourself, if you have errors change, if none, do good more than before and cure follows. In their books there is much that is superstitious, but yet the symptoms are fairly accurate and the treatment in some respects on the right lines. So much for Chinese ideas on the subject.16

# SYMPTOMS.

In Hong Kong beri-beri, like many other diseases, presents very varying symptoms. Side by side in a ward there may be two patients, one with wasted muscles, the other seemingly dying from dropsy, yet these two are known to be suffering from beri-beri. Turning to medical works on this subject it appears that each author endeavours to make a classification. Osler says that there are several types, but only gives definite name to one—" Acute Pernicious Beri-beri,"

though he describes the symptoms of other types. Pekelharing and Winkler's treatise (Cantlie's translation) many names are mentioned and discussed, among which are "The Destructive Kahké of Wernich," "Convulsive Beri-beri," "Polysarcous Beri-beri" (Duderhoven).20 It is difficult to decide what classification these two authors favour, as they desire to insist on the fact that a case may belong at one time to one class and at another time to another. They, however, for convenience in description, use the terms sub-acute or dropsical atrophic form, 21 sub-acute convulsive form, 22 atrophic form,23 edematous form,23 and mixed form.23 They object to the term "acute" as they hold that beri-beri is a disease 66 of a typically chronic form and it is only in appearance that it presents itself under an acute form while entering on a new phase.24 Dr. Manson describes paraplegic and dropsical cases and mixed paraplegic and dropsical cases.25 atrophic cases are designated by him dry beri-beri or beri-beria atrophica, wet beri-beri or beri-beria hydrops, and those in which there is a combination of both conditions, mixed beri-beri."26 He further classifies cases according to rapidity of development and severity of symptoms into acute, sub-acute, and chronic.26 But, as has been often shown, a case may at one stage be "dry," at another "wet," and at another "mixed;" so that in saying that a patient is a good type of this or that form of beri-beri one can only mean that at the time of examination the patient suffered from beri-beri of "wet" type or "dry" type or "mixed" type. In Hong Kong, as far as my experience goes, the majority of cases are of the dry atrophic and mixed types when they come for treatment--cases of dropsical type do come, but not nearly so frequently.

## NOTES AND REFERENCES.

1 "Papers on the subject of the prevalence of Beri-beri in Hong Kong" (published by Noroaha and Co., Hong Kong,

1889), p. 7.

<sup>2</sup> *Ibid.*, pp. 1, 2.

<sup>3</sup> *Ibid.*, p. 3. 1 Ibid., p. 5.

<sup>5</sup> Ibid., p. 6. <sup>6</sup> The Hong Kong Government Gazette for 1888, p. 597. <sup>7</sup> Papers on the subject, "Beri-beri in Hong Kong," p. 7.

 British Medical Journal, September 24, 1898, p. 872.
 "Studies in Japanese 'Kakké,' or Beri-beri," by Wallace Taylor, M.D., 1886.

10 "Tropical Diseases," by Patrick Manson, M.D., p. 232.

" Native Hospital.

"Chek" pulse.

<sup>12</sup> The British Medical Journal, December 4, 1886, p. 1,115.

<sup>13</sup> The Indian Lancet, November 1, 1897, p. 454.

<sup>14</sup> The British Medical Journal, January 6, 1900, p. 37.

"The British Medical Journal, January 6, 1900, p. 37.

15 The Chinese native doctors describe six pulses, viz., "Tsun" pulse right and left, "Kwan" pulse right and left, which they count from below upward from the wrist. The right "Tsun" pulse indicates the state of the lungs and diaphragm, the left "Tsun" pulse the state of the leart and pericardium. The right "Kwan" pulse shows the condition of the stomach and spleen, the left "Kwan" pulse of the liver and gall bladder, small intestine and left kidney. The pulses are examined by placing the index, middle, and ring fingers of the right hand on the patient's left wrist, with the index finger next the wrist, then the index finger determines the left "Tsun" pulse, the middle finger the left "Kwan" pulse, and the ring finger the left "Chek" pulse. To feel the right pulses the native doctor uses his left hand on the feel the right pulses the native doctor uses his left hand on the patient's right wrist in a similar manner, thus determining the condition of the right "Tsun," right "Kwan," and right

<sup>16</sup> These facts have been gathered from conversation with Chinese native doctors, and three Chinese medical books on

17 "The Principles and Practice of Medicine," p. 838.
18 "Beri-beri," by Pekelharing and Winkler, translated by
J. Cantlie. Pentland, Edin. and Lond., p. 14.

Ibid., p. 22.

<sup>20</sup> *Ibid.*, p. 5. <sup>21</sup> *Ibid.*, p. 22. 22 Ibid., p. 34.

23 Ibid., p. 45.

<sup>24</sup> Ibid., p. 33.

25 'Tropical Diseases," by Patrick Manson, M.D., p. 223.

26 Ibid., p. 232.

(To be continued.)

AN ENEMA FOR CHRONIC DYSENTERY. - Delioux de Savignac (Journal des praticiens, January 12) recommends the following formula:-

Tincture of iodine 10 to 20 drops. ... Potassium iodide 71 grains. ... 8 ounces. Water ...

M.

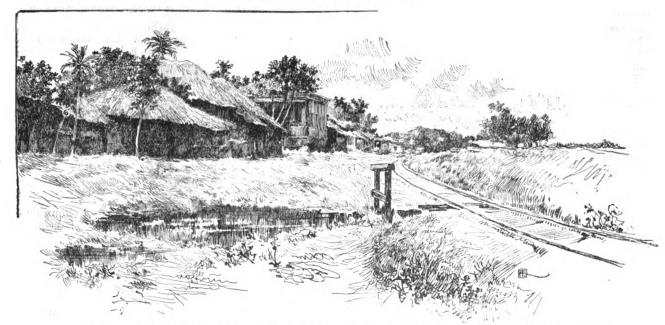
BLOOD-LETTING IN HEATSTROKE.—Carl Klein relates the case of a stoker on an American liner who suffered from heatstroke, and became convulsed. The man was "saved" by the abstraction of seven ounces of Klein recommends this treatment to the notice of military surgeons .- [München Med. Woch., 27 of 1900.]

THE MOSQUITO THEORY OF THE TRANSMISSION OF YELLOW FEVER, WITH ITS NEW DEVELOPMENTS. By Dr. Charles Finlay. - When the Culex mosquito, fasciatus, is confined in an atmosphere artificially rarefied to correspond to altitudes of from four thousand to six thousand feet, it is unable to fly, at least for a while, or to sting. It seems unlikely, considering the smallness of this mosquito's wings, that it will of its own accord, fly to any considerable height or distance, especially when weighted by the blood which it has absorbed. These peculiarities, according to the author, agree with what is known about the propagation of yellow fever, its tendency to invade the lower stories of buildings in preference to the upper ones, and its non-transmissibility in places like the City of Mexico, Puebla, Petropolis, situated at considerable altitudes above the sea level. The U.S. Army Yellow Fever Board has placed beyond a doubt the fact that the Culex mosquito, fasciatus, does transmit the vellow fever from a patient to non-immune persons perfectly isolated from other sources of infection, and, it has undertaken to demonstrate experimentally the fact, that, other sources, to which the yellow fever infection has been hitherto attributed, are absolutely incapable of determining an attack of the disease .-Medical Record, January 19, 1901.

Miss Lillie E. V. Saville, M.D., on whom the King has been pleased to bestow the decoration of the Royal Red Cross in recognition of her services at the International Hospital during the siege of the Legations at Pekin, is the daughter of the Rev. A. T. Saville, Congregational Minister, Rye.

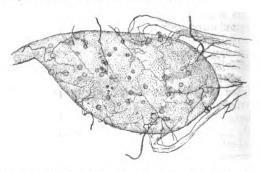
# Illustrations from the SPECIAL MALARIA NUMBER OF THE "PRACTITIONER," March, 1901, kindly lent by Messrs. Cassell and Co., La Belle Sauvage, Ludgate Hill, London.

(See leader in this issue.)

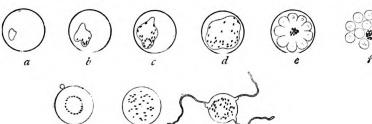


Anopheles-infected pool; originally a "burrow hole" made during railway construction, Sierra Leone. (Ross.)

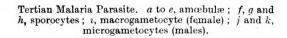


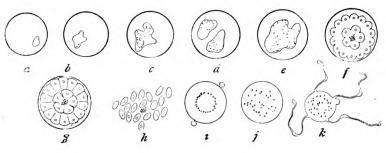


Stomach of Anopheles showing zygotes; heavy infection. (From a photomicrograph by Dr. C. W. Daniels.)



Quartan Malaria Parasite. a to d, amoebulæ; e and f, sporocytes; g, macrogametocyte (female); h and i, microgametocytes (male).





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THE

# Journal of Tropical Medicine

MARCH 15, 1901.

#### SPECIAL MALARIA NUMBER OF THE PRACTITIONER.

THE Practitioner for March, 1901, is devoted entirely to malaria and the result is a record of paludism in all its bearings. The Practitioner may not be so well known to medical practitioners in the tropics as it is to those at home, and the usual topics of its contents may not specially or directly interest dwellers in the The March number is an exception tropics. and we would recommend every practitioner in the tropics to secure a copy of the Journal. It may seem foreign to the purpose of one journal to recommend another-a rival in its province of medicine, as it would appear—but we deem it for the benefit of the profession to let this publication be widely known, and we have advised Messrs. Cassell and Company, La Belle Sauvage, London, E.C., to keep the March number of the

Practitioner in type for at least two months, so that the sufficient time is allowed for orders for the Journal to come in from the more distant parts of the tropics.

A mere mention of the names of the writers in this special number is a sufficient guarantee of the excellence of the Journal in question. Dr. Patrick Manson, C.M.G., F.R.S., discusses the "Ætiology, Prophylaxis and Treatment Malaria" in his usual masterly manner; D. C. Rees, Medical Superintendent London School of Tropical Medicine, gives a categorical account in a thoroughly scientific spirit, of "Malaria: its Parasitology, with a description of Methods for Demonstrating the Organisms in Man and Mosquito." Dr. Louis W. Sambon, Lecturer to the London School of Tropical Medicine, a "hero of the episode" of the mosquito-malarial-proof hut in the Roman Campagna during the summer of 1900, deals in an exhaustive fashion with "The Intermittent Fevers and Blackwater Fever." On these subjects no one is entitled to be listened to with greater respect than Dr. Sambon, and his statements and writings are at all times set forth with an accuracy and weight of argument which are calculated to carry conviction. Lastly, Mr. Ernest E. Austen, of the Zoological Department, contributes a carefully prepared and original paper on "The Genus Anopheles." addendum by Dr. Sambon, termed "A Medico-Literary Causerie," being the history of malaria, is perhaps the most fascinating chapter of all. With true respect for the work of early investigators and a thorough acquaintance with the literature of all that appertains to malaria from the earliest times, Dr. Sambon gives a vivid picture of the "fearful struggle between man and malaria."

A very excellent review of Tropical Diseases, by Dr. R. Tanner Hewlett, M.D., M.R.C.P., Physician to the Seamen's Hospital, Greenwich, and Bacteriologist to the Jenner Institute of Preventive Medicine, appears at the end of the Journal. We do not propose to give extracts of these important papers, but we would wish and advise every one interested in tropical medicine to get the current March number of the Practitioner, to keep it as a text-book and to have it as a reference on the subject of malaria and as a record of our knowledge of the subject of paludism, at the beginning of the twentieth century. The articles are beautifully illustrated and we are indebted to Messrs. Cassell and Co., for permitting a few of the illustrations to appear in this Journal.

# Translation.

ON THE VALUE OF DANYSZ'S MICROBE FOR DESTRUCTION OF THE RATS IN DRAINS.

By Dr. MÉNÉLAS SAKORRAPHOS, ATHENS. (Translated by P. Falcke.)

In the Annales de l'Institut Pasteur, of April, 1900, Danysz states that rats die from the infection of a coccus-bacillus which he describes as presenting on the whole the appearance of the bacillus coli. The Sanitary Commission of Greece, through its President, Mr. Kadsimichalis, had cultures of this coccus brought to Greece direct from the Pasteur Institute.

The following is a brief exposition of the results of

our own experiments :-

Having convinced ourselves that the cultures were still living, we commenced our experiments according to Danyz's method. (a) For the first experiment, ten rats, caught in the drains of Athens, were put into cages and fed with this culture, mixed with bread and water and a little salt, while during the following days we gave bread and cheese: On the fifth day a rat died, and we left the body in the cage for thirty hours, but none of the survivors attempted to devour it. On dissecting the rat, characteristic lesions were found in the spleen and intestines. The pathogenic microbe was isolated from the blood of the spleen and cultured on gelatine. (b) Two other rats fell ill, but they recovered; and on the twentieth day, being convinced that all the animals were in good health, we commenced a second experiment. Two other rats were removed into the same cage. Meantime we had prepared some fresh cultures, and separating the rats into two cages, we gave those in one cage stale cultures, and those in the other cage fresh cultures. Two animals died between the eighth and tenth days, and one was dissected, with positive results. The other was left in the cage in which all the other rats had been placed, but they did not devour the body. The survivors remained quite healthy. (c) Twenty days after, we made the third experiment. One rat died, and notwithstanding the fact that the survivors were fasting, only the tail was eaten. It must be added that, as the virulence of the microbe is increased when culture is isolated from the blood of an animal killed twentyfour hours' subsequent to the ingestion of cultures, we cultured direct on gelatine the blood of a rat killed after that time. When the cultures had multiplied

we attempted a third experiment, but notwithstanding, we obtained no results but the partial gnawing of one animal. As the result of our experiments, we came to the following conclusions:—

(1) That the microbe is not sufficiently virulent, at least as regards the rats of the drains in Athens.

(2) Even supposing that the mortality be augmented, the means suggested for the destruction of rats, in drains and other localities infested by them, is not efficacious, seeing that the survivors do not devour the dead bodies which have been infected by the pathogenic microbe of Danysz.

# THE SIEGE OF PEKING—ITS MEDICAL ASPECTS.

By LILLIE E. V. SAVILLE, M.D.

Extracts from an article in the China Medical Missionary

Journal, for January, 1900.

On June 21, the International Hospital was organised in the British Legation; Mr. Cordes, who was wounded at the time the German Minister was killed, and a young Russian student with a penetrating wound of the left shoulder-joint, being the first patients. Miss Lambert, a nurse connected with the S. P. G. Mission, was asked to take charge of the nursing arrangements; Dr. Poole, of the British, and Dr. Velde, of the German Legation, were the staff. The women doctors were asked to act as nurses, which we gladly did; Drs. Leonard, Mackie and Martin taking charge at night, while Dr. Gloss and I divided the day between us, and we were fortunate in getting a good deal of the surgical work, dressings, operations, anæsthetics. There were two trained nurses and other ladies also to help.

Those of us who had had to leave our homes at an hour's notice had of course very few drugs, and no dressings. The British Legation was poorly stocked, Dr. Poole had only just come out; fortunately, Dr. Velde had a large supply, all of the German army type—iodoform gauze tied up in little packets, very compressed, to be cut into strips, white muslin gauze squares, about 5 in. by 5 in., folded and compressed into another very small package. He had also a steriliser, which had to be used later when muslin curtains took the place of the white gauze, and bags of peat or saw dust that of wool. Instruments were

always sterilised for operation.

To most of us the experience of shot and shell wounds was new, and we had much to learn. The hospital first occupied two rooms in the Chancery bungalow, but gradually, as the number of wounded grew, we had to take over more rooms, till finally we had an operating room with two tables, five wards, three beds for five patients in the hall, and a convalescent ward for officers and civilians in Lady Macdonald's house, and another for the marines elsewhere. Three American ladies superintended the kitchen and stores; these were beyond all praise. Of course the hospital had first claim to commissariat stores, but nowhere else was there such fragrant pony soup, such really eatable mule stew; and I think the officers and men often thought it was worth

while to be slightly wounded to get a few days good feeding.

Owing to the difficulties of "diverse tongues" the men were "warded" wherever possible, by nationality; at any rate, no man was in a room where he could not talk to some one. Italians and French were together, with a French sister in charge; Russians in another room, where they were most tenderly cared for by Madame de Giers herself,-the Minister's wife, with them Germans were often put, one room was always full of the bright interesting little Japs. English and Americans naturally went together. There was one ward for officers and civilian volunteers, and here we nursed British, American, German, French, Italian, Austrian, Dutch, Australian and Russian. It was wonderful how our stores and supplies came in; beds and bedding, shirts and all that was necessary. They represented very much self-denial on the part of others and exhibited many expedients. The under pillows were made of straw from the picking of wine bottles, eiderdown quilts were cut up for soft pillows, a long piece of Chefoo silk, found in the Mongol market, made shirts, as did best damask linen and bright yellow cotton. "Imperial" shirts these were called. There were very few bedsteads; mattresses were placed on the floor, but every man did have a mattress from somewhere, also sheets and pillows.

Some of the marines had first aid dressings in their haversacks, but by no means all; and I believe the civilian volunteers had none, so that on admission to hospital the wound was just as it had been received. It was first examined as to entrance and exit points; the parts around washed and then a plugging of iodoform gauze lightly pushed in, or if penetrating, pushed clear through. Very rarely was there any examination of the interior, even if no wound of exit were present. The bullet was rarely hunted for at the first dressing. Over the wound were doubled up several pieces of the white muslin squares, then a pad of wool, and then a bandage. The hæmorrhage used to surprise me very much indeed; dressings were soaked in an hour or two, and packed again and again. At the second dressing, from the third to the seventh day, one saw that the thick firm coating of congealed blood was the best air proof medium that could have been devised. Our great enemies were flies; we had a plague of flies! but more of them

The character of the wounds was not that of open warfare, for the fighting was all behind barricades. Consequently the proportion of head injuries was large. Three penetrating wounds of head did well, though two had facial paralysis, and one required to have enucleation of right eye. Mr. B., an Austrian lieutenant, had a bad shell wound of the vault. About 2 by 2 in. of bone was removed, and dura mater exposed and brain. There was very severe hæmorrhage from the longitudinal sinus, but he did remarkably well, and in about a fortnight left the hospital as a convalescent patient. As a good deal of pus began to well up from the wound, it was decided to operate, and the opening was enlarged by chisel; some pieces of dead bone and of lead were removed. He came round from the anæsthetic smiling and con-

tented as usual as if he had wakened from a nap, and in a few days was up and about again. The day of the relief he went out as a convalescent, and as the wound did not require frequent dressing, was not seen for two days. He was brought back with a temperature of  $104.5^{\circ}$  F.; was very restless and delirious, and next day developed a purpuric rash on the hands, which quickly spread to trunk and limbs. A diagnosis of typhus was made, which gave place later to one of meningitis. He had to leave the British Legation when the hospital was broken up, but I heard from Dr. Velde a fortnight later that he had recovered completely and left Peking. The after-history of the case will be interesting.

There were several severe wounds of shoulder, and more so of elbow joint. In one case the bullet entered the outer side of right arm, passed probably through the shoulder joint into the lung. The patient had some cough, hemoptysis and orthopnæa, and for a time was very ill, and then began to improve rapidly, and the lung symptoms passed off. Some weeks later he complained of pain on the right side just outside the level of the seventh and eighth dorsal spines, but there was no definite tenderness, nor physical signs indicating the presence of a bullet.

Secondary operations undertaken on account of symptoms often disclosed bits of material—shirt or trouser—which had been driven into the wound, or the missing bullet or fragment of shell. But the proportion of shell wounds was small; one of face was fatal. The piece of shell had passed through the right side of face, leaving only a narrow strip of natural tissue between entrance and exit. The lower jaw was almost all gone, the upper maxilla shattered. The wounds were attended to and patient put to bed, but shortly it was found that the arch of the palate was practically gone, the fragments above pressing in the glottis and producing asphyxia. I had my fingers in the mouth holding up the plate while trachectomy was rapidly performed; anæsthesia was not required, and the patient died two hours later.

There were three perforating wounds of larynx. One died before the tracheotomy was completed, another on the second day, the third did splendidly, recovered his voice and returned to slight duty before the siege was over.

Two cases of compound fracture of tibia developed tetanus. The first, a German, complained on the morning of the fifth day of severe occipital pain, and by noon trismus was well marked, and after two days of intense suffering for himself and for those who watched him, he died. He had large doses of chloral and bromide of potassium, and morphine hypodermically. The wound was not foul.

ally. The wound was not roun.

The second case was Mr. N. of the Japanese Legation. In his case there was no wound of exit. On the second day it was found that flies had got under the upper layers of bandage and freely laid their eggs, and this although he had had his wife's private nurse constantly with him to fan. The bandages were removed and the dressings underneath the splint found to be quite clean; the limb was carefully washed with creolin and the splint reapplied, and he was moved into another bed with fresh bedding. Odour from the wound was noticed next

day, and though the dressings were frequently changed the discharge became most foul. On the ninth day it was decided to explore for the bullet. He did not take the chloroform well; breathing was irregular and peculiar in character; in fact I remarked it was as if he had diphtheretic diaphragmatic paralysis. The bullet was found, and a counteropening made for drainage. For the next two days he complained of being very tired, disinclined to talk and refused food; finally saying it was because his teeth would not bite. This was found to be the case, but there was no difficulty with swallowing. Gradually he developed slight tonic contractions; first of hands, then trismus, but never very marked. There were one or two attacks of opisthotonos just before death, which occurred four or five days after operation. He had chloral hydrate, gr. xxx., four-hourly as long as he could swallow and hypodermic injections of morphia.

We had an exciting case of strychnine poisoning. A Russian had taken "a little" from a small bottle looted from the store, thinking it to be bicarbonate of He was said to have vomited ten minutes When seen in the hospital, probably half an hour later, 9.30 a.m., he was comatose, breathing stertorous, opisthotonos and convulsive twitchings all over. Chloroform inhalation was commenced at once and administered continuously for two and a half hours. As soon as relaxation occurred at all efforts were made to pass the stomach tube. Though for a long time unsuccessful they provoked very free vomiting, and when the tube was at last passed the stomach was well washed out. At noon the limbs were fairly relaxed, and only trismus was marked, with occasional convulsive seizures and opisthotonos. The moment these re-commenced chloroform was started again. By three o'clock the attacks were only half-hourly, and after 4.45 they ceased, and he was able to drink. He seemed anxious to sleep and very thirsty. The next morning he got up and dressed, and the following day returned to duty.

Towards the close of the siege several were invalided with diarrhea and dysentery; there were two deaths from the latter among the Russians, but they were known to be exceedingly careless about their drinking water. We had three cases of typhoid, one of whom died after his removal to Tientsin. During the seige we had no death in hospital of any who had survived his injury twenty-four hours, except the two cases of tetanus. There have been two since—one a penetrating wound of pelvis, which became very septic with a good deal of diseased boneilium, and one bullet wound of head with extravasation of brain matter—the bullet not extracted.

No notes of cases were kept during the seige; this was a cause of great regret, but no one had the time : we kept the barest statistics, a summary of which I enclose. Pei-t'ang is the Roman Catholic Cathedral which was distant some four miles from us, and also in a state of seige. Explosion from mines is responsible for most of their casualties.

This is the merest sketch, and from memory; I have no data. The unity which was such a striking feature of the seige in Peking was nowhere more manifest than in the International Hospital. Differences of nationality, creed and professional status

were laid aside, and all worked with much happiness together.

CASUALTIES DURING THE SIEGE IN PEKING. June 20th to August 14th, 1900.

				and	lled died of ands		ound- ed	Casual- ties	Died of Disease		olun- eers	Т	otal
		Officers	Men	Officers	Men	Officers	Men	Per Cent.	Officers	Killed	Wounded	Killed	Wounded
A. LEGATIONS	.								-				
American		3	53	1	7	3	8	30.3			1	7	11
Austrian		5	30	1	3 2	3	8	42.8				4	11
British		3	79	1 2	2	2	8	28.1		3 2	6	6	26
French	.	3	45	2	9		37	100.0	1	2	6	13	
German		1	50		12		15	54.9		1,		13	
Japanese		1	24		5		21	104.0		5;		10	29
§ Russian		2	79		4	1	18	28.3	2	1	1	7	20
Italian		1	28	1	7	1	11	65.2				7	12
Total		19	388	4	49	9	136	48.7	2	12	23	67	167
B. PEITANG.	-												
French		1	30	1	4		8	41.9				5	8
Italian		1	11		6	1	3	83.3				6	4
Total		2	41	1	10	1	11	53.3				11	12
Grand Total		21	429	5	59	10	147	49.1	2	12	23	78	179

Notes —Wounded means incapacitated for duty, not simple wounds which could be dressed and the reen sent back to duty. Number of French wounded seems large, because they included all wounds, whether incapacitating for duty or not.

- \* Baron Von Kettler. † Mr. Cordes. ‡ Captain Ando. § Includes Cossacks of Legation.

# Reviews.

NEUE GESICHTSPUNKTE ZUR VORBENGUNG DER TROPEN-KRANKHEITEN, MALARIA, DYSENTERIE, &c. (New points of view for the prevention of tropical diseases, malaria, dysentery, &c.). By Dr. H. Breitung. Otto Borggold, Leipzig, 1900.

The author's views are entirely one-sided, but his opinions are decided and his suggestions merit

attention from the practical point of view.

The author considers that the prophylaxis and treatment of malaria are inadequate, and that quinine and phenocol do not answer the purpose for which they are intended. Dr. Breitung, moreover, suggests that "the initial cause of malaria consists only in the chemical processes of decomposition of the blood.' The blood becomes overloaded with urea, nitrogen, and carbonic acid, and there is a daily loss of bloodalkalies, &c., through secretions of perspiration and urine, besides alteration of the hæmoglobin of the red corpuscles, and loss of chloride of lime, silicates, and other mineral products from the blood. To correct these conditions the author recommends a certain "hygienic tropical salt" composed of "Baden salts," &c., which is supposed to "ensure to the blood serum its normal constituents." He also recommends a "tropical tonic" composed of formic acid and sulphate of iron, he advises a particular diet, mostly vegetables, and forbids the use of alcohol. The care of the skin is of the greatest importance; thirst may be alleviated by sponging the body and extremities in cool vinegar and water.

L'ENSEIGNEMENT DE LA PATHOLOGIE COLONIALE A L'ECOLE DE MEDECINE D'ALGER. (Instruction in Colonial Pathology at the Algiers School of Medicine.) Dr. A. Brault, Professor of Tropical Pathology, commences his work by a short preface on the importance of tropical pathology as an independent science which has been developed as commerce has extended

its far-reaching influence.

Dr. Brault gives an account of the course of study of tropical medicine at the Medical School of Algiers. The term of instruction is divided into two years. The first year is devoted to bacteriology, and the second year to diseases caused by animal parasites; to climate and its influence on health; to intoxications, including snake-venom and arrow poisons; also to diseases the nature of which are still unknown, such as:—Kala-azar of Assam, flood fever of Japan, yeupieng of Corea, &c., &c. A course of lectures and demonstrations of microscopical preparations and lantern slides are given in connection with the instruction on tropical diseases. A well-appointed laboratory for bacteriological research has been provided and a stable for animals required for investigation.

Dr. Brault deplores the fact that there is no hospital in connection with the school, so that the education might be practical as well as theoretical. He calls attention to the London School of Tropical Medicine, and the principles on which it is conducted, and suggests that there would be great advantage in founding in the French capital an institute for the study of exotic diseases, with particular facilities for becoming acquainted with the bacteriology, parasitology, internal diseases, skin diseases and surgery of

tropical countries.

HYGIENE ET PROPHYLAXIE DES MALADIES DANS LES PAYS CHANDS, L'AFRIQUE FRANCAISE. (Hygiene and prophylaxis of diseases of warm countries, French Africa.) By J. Brault. J. B. Baillière & Son, Paris, 1900.

This book, though mainly intended for the doctors in the French Colonies of Africa, will be found a practical and useful work for all those interested in the subject. It is divided into three parts.

Part I. deals principally with the climatology of tropical and sub-tropical Africa, acclimatisation, colonisation, and hygienic measures to be adopted

to ensure health.

Part II. deals with the particular African diseases due to animal parasites, among which the author includes craw-craw, negro lethargy, goundou, &c.

includes craw-craw, negro lethargy, goundou, &c.
Part III. is devoted to the medical geography of
the French possessions in Africa (W. and E. Africa,
Algiers, Tunis, &c.), and takes into consideration the
climatology, fauna and flora, pathology and other

kindred subjects.

Algeria is becoming so fashionable a resort for Europeans that any information concerning the climate and diseases of the country is of great practical importance. We look to so eminent an authority as Dr. J. Brault, the author of this book, for good work; and the care and consideration given to the preparation of the book at once commend it to notice. So many invalids and persons desirous of escaping the rigors of a northern winter or the vagaries

of the British spring, now prefer Algeria to the Riviera, that apart from the scientific value of this work the information it contains is of considerable value.

# Current Miterature.

#### BORRAS FEVER.

Dr. Francisco Muller, of Havana, presented a communication in which he held that there was no distinct pathological entity called "borras fever," as held by many Cuban physicians, but that what was called by this name might be either yellow fever or malaria or typhoid fever. He described these three types, and showed that they could not be classed as one disease, but that their symptoms corresponded to

those of the three fevers mentioned.

DR. J. R. AVELLANAL, of Bejucal, Cuba, said that he fully accepted in the solution of the problem of borras fever, the action of the three great pyrexias, malaria, yellow fever, and typhoid fever. He did not consider of much importance the arguments brought forward in support of the theory that borras fever was a disease sui generis, and indeed a careful study of the symptoms of the various types led to the conviction that this theory was incorrect. The absence of the malarial parasite in certain cases did not prove that it might not be present in others, and it was not always possible to obtain Widal's reaction in the typhoid form, since this was an aborted typhoid which ran its course in less time than was needed to obtain this reaction. Whatever dot bts there might be as regarded diagnosis, the treatment of borras fever, so called, was simple enough, consisting in the administration of quinine together with antiseptics and evacuants .- Pan-Amer. Congress, Med. Record, February 25.

### CAVITE FEVER.

Wright describes the form of a disease which seems to be endemic in certain localities of the Philippine Islands, characterised by abrupt onset, high temperature, severe muscular pain, extremely painful and tender eyeballs. The predisposing causes are high temperature, low damp localities, overcrowding, and possibly the nearness to salt water. The exciting cause is supposed to be microbic, though it is as yet unknown. No deaths have occurred and the pathology is obscure, but the author seems to think it due to a toxic peripheral neuritis. The disease is most apt to be confused with dengue, but the absence of an afebrile period and rash enables one to differentiate it from that disease. The absence of catarrhal symptoms separates it from epidemic catarrh. The treatment is rest in bed, with liquid diet, free opening of bowels and cold-tar antipyretics and quinine. In some cases it has been followed by local atrophy and paralysis.-Journ. Amer. Med. Assoc., February 23, 1901.

# MADURA FOOT.

Dr. C. M. DESVERNINE and A. DIAZ ALBERTINI, of Havana, reported two cases of madura foot occurring in Cuba. One of the patients and the amputated foot of the other were shown to the section. The parasite (Streptothrix maduræ) was described and preparations of the same were exhibited.

Dr. Thomas N. Calnek, of Jan José, Costa Rica, said that he had seen many cases of this disease in Costa Rica, where it was generally confounded with elephantiasis. He believed the disease was curable in the early stages when the nodules were small. Elephantiasis was rare, but madura foot quite common in that country.

Dr. Debayle, of León, Nicaragua, had seen many cases, the disease being not at all rare in that country.

Dr. Moreno, of Havana, did not think that the absence of filaria in suspicious cases should be held to negative the diagnosis of elephantiasis.—Pan-Amer. Congress, Med. Record, February 25, 1901.

# PLAGUE.

SOME OBSERVATIONS ON PLAGUE AND ITS TREATMENT WITH LUSTIG'S SERUM.

By Dr. H. N. CHOKSY, BOMBAY.

(Reprinted from Vol. IV., Bombay Med. and Phys. Soc. Trans.)

Types of Plague.—Dr. Choksy divides plague cases for clinical purposes into seven types. (1) Pestis minor, (2) pestis ambulans, (3) simple bubonic, (4) septicæmic, (5) pneumonic, (6) cellulo-cutaneous (7) non-typical forms. Of these the cellulo-cutaneous is the only interpolation, it is described as a "cellulocutaneous necrosis, large necrotic patches involving the skin and the sub-cutaneous cellular tissue.

The clinical phenomena that manifested themselves after the injection of serum, were: moderation in the intensity and duration of fever, improvement in the state of the circulation as shown by increase of arterial pressure, diminution in the size of, and lessening of pain in buboes, cessation in the progress of advancing lymphatic infection, clearing of the mental faculties, and a general improvement in the condition of the patient.

# PRELIMINARY CONCLUSIONS.

The following preliminary conclusions were deduced from the above observations:-

(1) That the serum exerted a distinctly favourable

influence on the course of plague.

(2) That where it failed to avert death, it prolonged life, and temporarily ameliorated the condition of the

(3) That it did not exert much effect in those types of plague that are characterised by an extremely high

mortality rate.

(4) That its application therefore was mainly, though not exclusively, limited to the bubonic type of

plague.

(5) That there were limitations to its use in hospital practice, as about 50 per cent. of all admissions die within forty-eight hours, 20 per cent. recover naturally,

and there remain about 30 per cent. that can be influenced by the serum treatment.

(6) That its use would be more effective in private practice, as early cases would be treated, and that encouraging results, giving a recovery rate of 59.37 per cent. in 32 patients, have been obtained up to now.

(7) That it exerts no deleterious influence on the patient, and could be injected into the healthy not only without any ill-effects, but with positive good, as it is capable of conferring immediate but temporary immunity against plague; this immunity may last from ten to fifteen days.

OTOMYCOSIS IN THE TROPICS, by H. Campbell Highet, C.M., M.D., Physician to the Royal Palace, Bankok.—Otomycosis, or the growth of fungus in the external auditory meatus, is apparently a rare disease in temperate climates, if one may judge from the scanty literature on the subject. During eight years' work in Singapore and Bankok, however, my experience has been that it is quite a common—if not the most common—disease affecting the external auditory meatus which one meets with in the tropics. The reason for this appears to be that all the conditions favourable to the growth of fungi are present—namely, heat, moisture, and the presence practically everywhere in abundance of the spores of the fungi. All my cases were in adult Europeans. Children are said to be exempt from the disease.

Symptoms.—These vary in intensity according to the severity of the case. There may be simply a sensation of blocking of the ear with slight impairment of hearing. Itching, pain, and often a considerable amount of watery discharge, is complained of, and the patient notices that his pillow has been stained during the night by a yellowish fluid which he finds exuding from one or both ears. Both ears are usually affected, but often in different degree. attack of acute diffuse inflammation of the meatus supervenes, as is unfortunately a frequent complication, great pain and sleeplessness follow, and often a considerable rise of temperature is noted for a few days.

Physical Appearances.—In typical first attacks the meatus is seen to be filled up with a soft wool-like substance which varies in colour, according to the type of fungus present. As I have seen it, it is usually of a pale lemon yellow or a very pale yellowish green. On passing a probe into the canal, the obstruction is found to be soft and moist and is readily removed. The walls of the canal may be found to present quite a normal appearance, but as a rule they are somewhat reddened, and the irritation may have gone as far as to have led to some desquamation of the epithelium. In cases in which the attention of the patient has been suddenly drawn to his ears by an acute attack of pain and deafness, it will be found that there are signs of extension of the catarrh to the middle ear. In chronic cases, besides the soft masses of recent fungus, impacted masses of a material like sodden newspaper are found in the meatus. These come away in large scales, or even casts of the canal, and the walls are found to have undergone thickening, so much so as in some cases to hide the tympanic membrane. Microscopical examination of the fungus

reveals the presence of such common fungi as the penicilium glaucum, aspergillus, and more commonly

in my experience the mucor mucedo.

The Complications noted in my cases were diffuse inflammation of the external auditory meatus, acute serous catarrh of the middle ear, chronic catarrh of the same, perforation of the membrana tympani, swelling and even abscess of the lymphatic glands at the angle of the jaw, and eczema of the meatus and pinna. The acute adenitis, the result of septic infection from the ears, was so severe in one case as to require the administration of chloroform on two separate occasions in order to open abscesses on either side of the neck.

Diagnosis is usually easy, and is at once settled by

the microscope.

Prognosis.—This is a readily curable disease, but is only so if the case be taken charge of by the physician himself. To hand over the details of treatment to the patient is a plan which leads to much trouble and disappointment. I have known of cases going on for weeks and even months when carelessly attended to.

Treatment.—As much of the fungus as possible should be removed with a cotton and probe, and then the canals should be well syringed with a warm solution of bichloride of mercury (1 in 5,000). The canal is then thoroughly dried with cotton wool, so as to get rid of all water which favours the growth of the fungi, and finally it is sponged with a solution of bichloride of mercury in absolute alcohol (1 in 1,000). This gives rise to considerable pain for a moment, but it soon passes off. The alcohol is allowed to evaporate, and then the meatus is plugged with sterilised cottonwool, which is not removed until the following day. It will then be found that many of the spores that had resisted the action of the germicide applied the previous day have germinated in the interval, and there is apparently as much fungus as before. It is not so deuse, however, and is more easily removed by the same means. This process is repeated daily until no more fungus forms, then the eczema or other complication is treated in the usual way. After the fungus has ceased to grow I often insufflate a powder of boric acid 2 parts, bismuth salicylate 1 part, and oxide of zinc 3 parts. Such a combination completes the cure not only of the otomycosis, but also of the eczema of the meatus.

Prophylaxis consists in keeping the ear canals very clean and dry, and especially in avoiding the entrance of sea water, which, by reason of its deliquescent salts, apparently conduces more than fresh water to the growth of the fungi.—Brit. Med. Journ., Dec. 22, 1900.

#### MISCELLANEOUS.

QUININE AND HEMOGLOBINURIA.—An interesting account of "blackwater" following the administration of quinine is given in *The News* under the heading of Assam Missions, by Mr. and Mrs. Mason. Their son, a boy named Gordon, died of fever, and the parents state that "No doubt exists in our minds that quinine was the direct cause of death. Let those who handle it beware if its use is soon followed by a chill." That the child showed a marked idiosyn-

cracy to the action of quinine appears evident, as perusal of the following admirable description by Mrs. Mason shows:—

"I had the children in Darjiling in the spring of 1899. While there, Gordon had two chills, followed in the one case by subnormal temperature, in the other by not high fever. But each time the water he passed was so black that after the second I called the doctor, who took it for analysis. While on our way home during last May, Gordon had such an attack, and again three or four times during the Then we noticed that each time it was summer. after he had had one grain of quinine, and remembered that in Darjiling and on the way home he had had the quinine shortly before the chill. Here we noticed that just about two and a half hours elapsed after giving the one grain quinine capsuled pill until the chill came on. He had not in any case had fever just before, but showed symptoms of malaria, so we gave the quinine as a preventive. In one case the temperature ran above 106 degrees F. in less than two hours, and within six hours after was down to 96 degrees. Every time the water passed during the chill was like black blood. We corresponded with Dr. Rivenburg about it. He analysed the water and pronounced the disease "blackwater." telling us the child ought to leave the country. gave no more quinine and Gordon had no fever from August, 1899, to June, 1900. From his birth he had been an unusually large, robust child; and during the past year, as always, strong and active. But early in June he began to have fever from time to time, finally settling down to every other day, temperature sometimes not much, again going to 105 degrees. We learned that the doctor had "euquinine" which was said to have all the good but none of the bad effects of quinine, so two doses of this were given to Gordon on different days, and we hoped much from its use, but it turned out that there was no more in On June 29 he had some fever during the forenoon, not much, and temperature had gone down to normal and he was playing about feeling bright and lively. Mr. Mason was very anxious to break the fever which seemed to be getting such a hold upon him, and strongly advised by the doctor, we gave quinine in capsuled pills. In just, two and a half hours he began to be chill and passed some of that terrible water. In less than two hours his temperature was 106 · 3 degrees, chill very hard followed by great perspiration, and temperature dropped slowly to 97 degrees. He did not get back his strength and seemed tired, but was about, playing as usual. On July 5 he had fever; on the 6th was very bright and lively; and on the 7th temperature 104 degrees; on the 8th he went to meeting as usual, but in the afternoon his temperature went up to 103 degrees; on the 9th to almost 102 degrees in the afternoon, then it was going down and he was sweating. That morning the "euquinine" came from Calcutta and on the doctor's advice we gave Gordon a dose in powder. In one hour the child was in a terrible chill, and the water he passed was simply black! His temperature rose 1 · 2 degrees in fifteen minutes, reaching 105 · 2 degrees at 3.5 in the afternoon. Then it fell and rose and fell again keeping not far from 100 degrees to the end. He could keep

nothing on his stomach after Sunday the 8th, drank a great deal during Monday and the night, but did not care for anything after early Tuesday. evidently suffered much in the abdomen. Toward noon of Tuesday he seemed not to know or notice much, and with one slight exception showed no sign of consciousness afterward."

PEKIN INVITES PESTILENCE.—A report from Pekin. dated November 15, says: "Sanitary conditions here are becoming serious. Since the foreign occupation many Chinese have died of smallpox and other infec-Fearing that their funerals will be tious diseases. interfered with, they have kept most of the coffins containing their dead in their houses and courtyards. The question of removing garbage has become one of grave importance. As the natives are forbidden to deposit refuse in the streets, there is now an enormous accumulation in their dwellings and yards, which threatens a serious epidemic. In view of the large number of troops in and near the capital, the consequences of such an outbreak would be frightful. Smallpox, which is always prevalent, is much more malignant during winter, and the danger here is now alarmingly increased."—Sanitarian.

### Letters, Communications, &c., have been received from :-

A.—Mr. G. N. Alexis (Grenada).
C.—Dr. D. W. Carr (Isfahan).
D.—Dr. A. B. Dalgetty (Adampore).

G.-Dr. R. M. Gibson (Hong Kong).
H.-Mr. Gordon Hooper (London); Dr. W. Hossack (Calcutta).

K.-Dr. W. E. de Korte (Cape Colony). N.—Dr. G. H. F. Nuttall (Cambridge).
R.—Dr. R. Ross (Liverpool)

S .- Dr. Malcolm Smith (Singapore); Dr. R. A. Shekleton (Newtownards); Dr. Van der Scheer (The Hague).

# EXCHANGES.

Annali di Medicina Navale.

Archiv. für Schiffs u. Tropen Hygiene.

Archives de Medicine Navale.

Archives Russes de Pathologie, de Medec., Clinique et de

Bacteriologie.

Australasian Medical Gazette.

Boletin de Medicina Naval.

Boston Medical and Surgical Journal.

Bristol Medico-Chirurgical Journal. British and Colonial Druggist.

British Journal of Dermatology.

British Medical Journal.

Climate. Clinical Journal.

Clinical Review.

Giornale Medico del R. Exercito.

Hongkong Telegraph.

Il Policlinico.

Indian Engineering.

Indian Medical Gazette.

Indian Medical Record.

Janus.

Journal of Balneology and Climatology.

Journal of Laryngology and Otology.

Journal of the American Medical Association.

La Grèce Médicale.

Liverpool Medico-Chirurgical Journal.

Medical Brief.

Medical Missionary Journal.

Medical Record.

Merck's Archives.

New York Medical Journal.

New York Post-Graduate. Pacific Medical Journal.

Polyclinic.

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Revista de Medicina Tropical.

Revista Medica de S. Paulo. South African Medical Journal.

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The Medical and Surgical Review of Reviews.

The Northumberland and Durham Medical Journal.

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  - 2.—Manuscripts sent in cannot be returned.
- 3.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
- 4.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.
- 5.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Editors.
- 6.—Correspondents should look for replies under the heading "Answers to Correspondents

# The Journal of Tropical Medicine.

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# Original Communications.

## A CASE OF YELLOW FEVER AT SALTPOND, GOLD COAST.

By S. Osborne Browne, M.B., C.M.
Assistant Colonial Surgeon.

February 27, 1901.

I THINK the following case may be of interest to readers of the JOURNAL OF TROPICAL MEDICINE, especially as the Gold Coast is being largely opened up to European enterprise at the present time.

In the Journal for July, 1899, Dr. Elliott gives an

In the Journal for July, 1899, Dr. Elliott gives an account of three cases of yellow fever in Saltpond, and it is my fortune to add one more case to the number.

H. M., mercantile clerk. Scotch. Aged 22.

Previous History.—Came to Saltpond one year ago;
never in tropics before. Strong robust constitution;
nervous; sanguine temper, inclined at times to melan-

cholia or irritability.

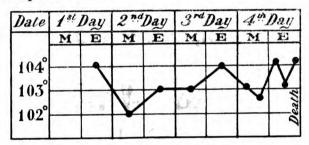
From what I hear he was a teetotaler at home, but like many others he took stimulants on the Coast, and it often assumed the pernicious form of beer. Had several bilious fevers, from which he rapidly recovered. For some time before his last illness he ate oranges immoderately, and was frequently unwell from dealing with rubber. His residence was in a good position on rising ground, clean, new and not very near native houses or the lagoon. His illness occurred in the height of the dry season, and mosquitoes were conspicuous by their absence, although a few exist, especially culex.

History of Present Illness. 1st day.—8 p.m. Temperature 104°F. Pulse 100, strong. Tongue dirty brown in centre, red at edges. Skin dry. Very restless. Great headache. R: Calomel gr. 15; pulv. jalap. gr. 25; rhubarb, gr. 12; phenacetin, gr. 20.

In tabloids.

2nd day. Morning.—No sleep during night. Vomited the medicine during night. Very restless. Skin dry. Vomited mucus with green curds. Tongue

still dirty. Temperature 102°. Pulse 90. R: Tab. quinine bisulphate, gr. 3. Seven tabloids taken, i.e., gr. 21. Acid. hydrocyanic dil. to relieve the gastric distress. *Evening*.—Condition much the same as in morning. R: Calomel, gr. 15. Turpentine enema. Temperature 103°F.



3rd day. Morning.—Patient lying in his pyjamas on a couch without covering in strong draught. Temperature 103°F. Pulse 110, soft, weak. No sleep last night. Tongue same. Eyes bloodshot. Gave magnes. sulph., and quinine bisulphate, gr. 21. No parasites in blood. Evening.—Copious dark green stools. Patient deaf from quinine. Temperature 104°. First black vomit consisting of clear mucus splashed with a very dark brown oily substance in small amount.

4th day. Morning.—Copious vomit with increasing amount of dark brown oily splashes, and also coffeegrounds like material. Vomiting without much effort. Copious dark green stools with a little substance like the splashes in the vomit. No sleep during night: Extreme restlessness and some anxiety. Complains of being "sore all over," but no headache and only an uneasy sensation in the epigastrium. Temperature 103°. Pulse 100, small, thready. Skin dry. Ideas wander at times. Gave him 15 gr. quinine bihydrochlorate into gluteal muscle; also 40 gr. per rectum. Champagne at intervals between the vomiting with 1 gr. cocaine and ½ gr. morphine. Gave ½ gr. pilocarpine hypodermically. Fed him all day on meat and milk enules and enemata of egg and cham-

pagne. Temperature kept hovering between 102.6 and 104°F. Evening.—About 2 p.m. he passed urine copiously, but not again. Extreme restlessness. About 7 p.m. he got very yellow; copious black vomit. Mind wandering; moaning and tossing about. Features pinched. Liver much enlarged. Became delirious, and had to inject morphine to keep him in bed. Put hot pack round waist and wrapped him in blankets. Still no urine. Expulsive efforts of stomach violent, but vomit falling back time after time with gurgling noise. Extremities growing cold. Coma. Face livid, turgid, and profuse sweating occurred. Bleeding occurred from the nose and gums just before death, which happened at 11 p.m.

Post-mortem.—Almost immediate blotching of the body with livid cyanosed blotches, especially on back, which wore off in places, leaving the body a general dirty yellow. No smell was detected from the body. The blood was dark and cyanosed.

I regret that no specimen of urine was obtainable.

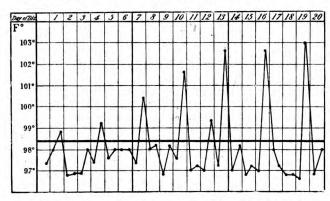
# A CASE OF QUARTAN SHOWING CYCLIC VARIATION OF PARASITES.

By G. Douglas Gray, M.D.

London School of Tropical Medicine.

Communicated by Dr. C. W. Daniels, Medical Superintendent, London School of Tropical Medicine).

Carum, Indian, adult male, native of Madras. Left Colombo three weeks before admission to hospital. Said he had no fever on the voyage. He was admitted to hospital for ulcers of the legs, but had on the fourth day after admission an evening temperature of 99·2°. Three days later—the seventh day after admission—it rose to 100·4°. On the tenth day it was 101·6° and then three successive cycles at regular quartan intervals registered from 103° to slightly over 104° F. Quinine was administered after this and there were no further rises of temperature.



The chart was therefore a typical one of a developing case of quartan fever, at first gradually increasing in severity and then practically maintaining a certain degree of intensity till quinine was given.

Each rise of temperature was for a period of six to eight hours, and the patient passed through the classic stages of an attack of ague. Beyond the headache, and on one occasion, slight delirium, there was nothing beyond the ordinary febrile phenomena of importance.

Blood examinations were commenced just after the third cycle, so that three entire cycles were observed before quinine was given.

The main observations were made with a view of showing the rate of increase, or otherwise, of the parasites. For this purpose the number of parasites and leucocytes in a number of fields were examined in fresh blood films to determine the ratio of parasites to leucocytes.

A separate estimation of the number of leucocytes in a cubic millimetre of blood was made each day. From the combined results of these observations the number of parasites in a cubic millimetre of blood could be approximately determined.

During the first observed, but really fourth cycle, there was an average of 500 parasites; during the second observed cycle, an average of 446 per c.mm.; during the third an average of 627; and the fourth observed cycle showed an average of 302 parasites per c.mm. Quinine was then given and continued, though the parasites did not immediately disappear, and three days later 210 per c.mm. were still present; on the following day 35 per c.mm. were found, and later on only so occasionally that the number could not be estimated.

There was no leucocytosis, the highest count only revealing 7,710 per c.mm.

These results are of interest. They show that though the number of spores formed by each parasite is six or more, if uninterrupted multiplication existed and the parasites in the first observed cycle were 500, in the second they should have been at least 3,000, in the third 18,000, and at the commencement of the fourth cycle 108,000.

However large allowance may be made for the inaccuracies both of the method and observations, it is certain that no such multiplication occurred. It therefore follows that some natural check existed which, when the number of the parasites had reached a certain level, prevented any such multiplication, and that during the period in which the cycles were observed this check was sufficient to neutralise the natural rate of increase and maintain a constant number.

These observations have an important bearing both on natural cure and immunity, and on the protracted periods during which the parasites appear to be latent.

As regards "natural cure," it is obvious that any increase in the "check" to the multiplication of parasites would result in a diminution of the number of parasites in each cycle until they were too few to cause any symptoms, and would ultimately lead to the extinction of the parasites or to their numbers being too small to be found in ordinary examination.

As regards immunity, it also follows that if the conditions are such that multiplication by sporulation is impossible, an infection will lead to no great formation of sporocytes, or their perpetuation. As regards "periods of latency" (a better term than "latent periods"), all that is required is that the check to indefinite multiplication by sporulation of the parasites should occur when the number of parasites is so

small that they are not sufficient to cause symptoms, or to be found by ordinary methods of examination. One parasite to the cm. would probably escape detection, even if frequent examinations were made; and yet with that number there would be some millions in the total blood.

This, Dr. Daniels informs me, is Major Ross's theory of the periods of latency, and avoids the necessity of assuming the existence of an unobserved special

or latent form of the parasite.

That parasites can exist in the blood in small numbers, remain so, and yet continue to breed, was shown in this case, as from time to time an occasional parasite was found belonging to a cycle twenty-four hours in advance of the one described, but only on one occasion did this generation make its presence apparent by causing a rise of temperature to 99.4° F.

BERI-BERI IN HONG KONG, WITH SPECIAL REFERENCE TO THE RECORDS OF THE ALICE MEMORIAL AND NETHERSOLE HOSPITALS, AND WITH NOTES ON TWO YEARS' EXPERIENCE OF THE DISEASE.<sup>1</sup>

By B. MacLean Gibson, M.D., C.M., Edin.

(Continued from p. 99.)

EPIDEMIC OF BERI-BERI-GERMAN BLIND SCHOOL.

THE German Blind School for Chinese children is situated near West Point, Hong Kong, and from its situation one would expect it to be malarial. It lies low, and its site was cut out from the side of the hill, and no proper through current of air is possible, nor are the rooms freely exposed to sunlight. The back rooms especially are very dark and unhealthy. The children attending the school are girls from 2 to 20 years of age, most of whom have lost their sight through purulent ophthalmia. They live and board with the The first case of beri-beri noticed was in matron. September, at which time there were eleven children in school: of these eight took ill, but none died. Earlier in the year, however, two children had died with signs of ædema and endocarditis, one of whom was ill only a few hours. The epidemic probably began with those cases. The first case (in September) was a native of Canton, and had resided in the school for a year. The matron noticed that two of the cases had fever, and all had weakness of the legs and swelling. Medical examination revealed cedema of legs and face, and irregular dilated heart in all the cases. After becoming affected with beri-beri, the children were kept apart from the others. The usual diet was rice, pork or salt fish and vegetables. The type of disease

was beri-beri hydrops. The first of the blind children, Tsing Lin Yan, admitted on October 22, 1899, to the Nethersole Hospital, showed severe cardiac symptoms, ædema of the legs and inability to walk. Under the influence of rest, and iron and quinine, her heart became regular, the ædema disappeared, and after a few days she was able to walk slowly. The others were in a similar condition when admitted to the hospital. No albumen was found in the urine of any of these cases. The noticeable feature in these cases was the great predominance of cardiac symptoms. Altogether eight children from this Institution suffering from beri-beri were treated in Nethersole Hospital, and on December 8 they were taken to Macao in good health.

EPIDEMIC OF BERI-BERI IN BERLIN FOUNDLING HOUSE, HONG KONG.

Later in the year (1899), November 25, a case was sent to the Nethersole Hospital from the Berlin Foundling House, the symptoms pointing to beriberi. The Berlin Foundling House is situated at Breezy Point in the western district of Hong Kong. The house is well built and drainage good, but the younger children, those who suffered from the disease, dwell in the lower parts of the house. The inmates are girls who in infancy had been abandoned by their parents, rescued into and brought up in this institution. At the time of the outbreak there were sixty-nine infants in the lower part of the house and twenty-seven older girls in another part. The former only were attacked, and three of them were sent to the Nethersole Hospital. The majority of the younger children whom I examined at the Foundling House showed slight cedema over the tibia and forehead, exaggeration of the knee-jerk, slight dilatation of the heart to the right of the sternum, and the pulse irregular in frequency and of low tension and small volume. Leung Wa, a child of 4 years, was the first case admitted, with a history of having suffered from eye disease at the time of the onset of beri-In this case the knee-jerk was beri symptoms. absent and no albumen was found in the urine. The second case, Mak Kin, aged 5 years, was bed companion of Leung Wa, and in her case one knee-jerk was absent. The third case, Chan Yan Lin, aged 2 years, slept in the same room as the two girls already mentioned. She showed knee-jerk diminished but not quite absent. These could only walk with great difficulty. On January 23, 1900, I again examined these three cases and found that in the two first mentioned the patellar reflex was slow and obtained with great difficulty, and that their movements were less free than normal. There had been frequent intercourse with the German Blind School, and probably beri-beri poison was carried from one to the other. The type of the disease was beri-beri hydrops, and at first seemed to be of a less severe character than in the Blind School. There appeared to me to be overcrowding. The diet was liberal, and consisted of rice with vegetables, eggs or meat, rice congee and milk; though it was afterwards discovered

Owing to want of space, the Editors regret that they are unable to give the detailed account of nine cases of beri-beri recorded by Dr. Gibson. The patients referred to were all supplied with a liberal diet, including beans and pork. Brandy, quinine and iron, digitalis and strychnia were the chief drugs employed. The article is accompanied by several photographs showing the different types of beri-beri with which we are familiar.

that the Chinese cook was in the habit of buying the most inferior rice he could obtain-of a poorer quality than the ordinary coolie uses himself. On December 7 all the children were removed from Hong Kong to Macao, including the three cases from the hospital. From the medical attendant at Macao I received information of the sudden illnesses and deaths of three of the children. On the day after arrival in Macao, one of the children had vomiting, diarrhea and headache, followed by collapse and death in thirty-six hours. The second had similar symptoms and died after fifteen hours' illness. Two weeks later a third case occurred. The first symptom was retention of urine, followed by vomiting and collapse, and legs from knees downwards were quite dark-coloured; death occurred seventeen hours after the onset of the Vomiting and diarrhea have always symptoms. been recognised as very dangerous symptoms in beri-beri, especially if the heart is dilated. My opinion is that these deaths were due to beri-beri, though earlier symptoms may not have been apparent.

I will now seek to group the facts contained in these notes of cases under the following headings, discussing each as may seem necessary: (1) symptoms and signs in early cases, (2) symptoms and signs in more advanced cases, (3) morbid anatomy, (4) etiology, (a) specific cause, (b) predisposing causes, (5) diagnosis,

(6) prognosis, (7) treatment.

(1) Symptoms and Signs in Early Cases.—One of the earliest symptoms noticed is fever. A Tim (No. 1) suffered for a week from fever before marked beri-beri symptoms appeared. Li Yan Lin (No. 2 case) and Wang Si Kin, No. 8,27 had early high fever, the former for four days, the latter for three days. The temperature charts of these two patients illustrate well the character of the early fever in beri-beri; the fever in both reached 104° F. on the same day as the first beriberi symptoms were noticed. After the first few days the temperature is low but still irregular. On questioning patients with subacute or chronic beri-beri as to the presence of fever early in their illness, one Chan Kwai said he felt hot and cold for a few hours. Another, Chaw Chek, case No. 6, had fever for one day, a third, Lo Mo Tsun, No. 3, had fever for one night. Some answered that they had had no fever at the beginning of the disease, but probably the fever had been of such short duration that it either had not been associated with their subsequent illness or had been forgotten. Early high fever is a very constant symptom, but its absence does not invalidate a diagnosis of beri-beri. Another very early symptom is numbness, expressed by the Chinese word "pi," which is often present with the fever or comes on soon after; as a rule this numbness is felt over the dorsa of the feet, rising soon over the tibia and thighs. In some, however, the hands and arms and the whole body become numbed at an early stage. Associated with numbness are weakness and loss of power of the legs. The pulse in early atrophic cases, though irregular in frequency and rapid, is yet of good volume and tension; but in early dropsical cases the pulse is of low volume and tension. The patellar reflexes are absent or diminished. When even the case was seen early in the disease patellar reflexes had occasionally disappeared. "Sam tin" or "pap pap tin" as the

Chinese call palpitation of the heart, may be present early in the disease and is very alarming. This disturbance of the heart's action was found in many of the Blind School and Foundling House children. Œdema of the legs is a constant early symptom, which may be very slight in "dry beri-beri," but in dropsical cases may be considerable a short time after the onset of beri-beri symptoms. Among the children of the above schools, marked ædema was a striking early feature. Other early symptoms, but of lesser diagnostic importance, are headache, pain in epigastric region and constipation.

(2) Symptoms and Signs in more Advanced Cases of Beri-Beri must be divided into those seen in (a) Atrophic cases; (b) Dropsical cases; (c) Mixed types.

phic cases; (b) Dropsical cases; (c) Mixed types.

(a) In atrophic cases which have passed the early stage one finds that the temperature is practically normal and that numbness is felt chiefly in the legs and hands, but also over the abdomen. The legs are weak, and patients may be unable to walk or raise themselves from the recumbent position without help. The muscles of the calves of legs and thighs are atrophied, and on pressing the calves acute pain is felt. Should the patient be able to walk he will probably do so with a peculiar "steppage" gait, as though he had to step over obstacles on the floor. Case 4 after being in hospital for a time showed this gait. Palpitation of the heart is now a more prominent symptom than in the earliest stage of atrophic cases, while the pulse is very characteristic-of low tension, small volume, irregular in frequency and rapid, 100 to 120 per minute. Sometimes it is not possible to count the pulse, as the tension is so low and the volume so small. The cedema is very slight in this type of beri-beri, and is noted over the crest of the tibia and on the fore-The patellar reflexes are quite absent; as the patient improves, however, the reflexes gradually return. On examination of the heart diffuse pulsation over the cardiac area is seen, while the apex beat seems displaced downwards. The heart sounds are free from murmurs, but faint; the second sound at the pulmonary area is often reduplicated. the heart becomes excited under examination the cardiac sounds constantly vary in intensity. Digestion is good, and the patient is remarkably well considering the severity of the symptoms. These considering the severity of the symptoms. These are the usual symptoms of a typical atrophic beriberi case in Hong Kong, when the disease has asserted itself for weeks or months. At times, however, I have seen more severe symptoms, e.g., case 7 had hiccough for a day, his voice became weak, and he complained of pain over the larynx. Another case which I saw in the Tung Wah Hospital also suffered from an affection of the larynx. A third patient could not button his coat so atrophied were the muscles of his hands and arms.

(b) On examination of a well-marked dropsical beriberi case, one finds the cardiac symptoms predominating, while numbness, weakness, and loss of power of the legs are also present. The patellar reflexes are absent. The pulse can only be felt with difficulty because of its low tension and small volume. The heart is dilated to the right of the sternum, the apex beat being displaced downwards and outwards. No





murmurs are heard. The most prominent symptom is the severe swelling, the patient having the appearance of a serious case of Bright's disease. In a male there was ædema over the legs, thighs, scrotum, penis, abdominal wall, and chest as high as the clavicles. The patient seemed in a critical condition, and when the ædema rises thus far the Chinese become alarmed. I remember seeing an eye patient develop dropsical beri-beri symptoms so rapidly that he died before I realised that he was seriously ill. This case occurred very soon after my arrival in Hong Kong, and were I to meet another such case I should try venesection with the hope of saving life. On examination of the urine of dropsical cases no albumen was present.

(c) In the mixed type there is a combination of the symptoms of the two previous types, the edema of the legs being greater than in atrophic cases, but not so marked as in dropsical cases. The puerperal case met with did not seem to differ in any way from types already referred to. Beri-beri among children, as far as I have seen it in Hong Kong, tends to assume the dropsical form, but recovery is more rapid than among adults. I have seen no mental disturbances in any beri-beri case.

(3) Morbid Anatomy.—As the Chinese are opposed to any interference with their dead, post mortems are rarely made in our hospitals, and I cannot speak of the morbid anatomy of beri-beri. Pekelharing and Winkler (Cantlie's translation) have proved that the disease is really a multiple neuritis chiefly confined to the peripheral nerves; and as one approaches the central nervous system the pathological evidence of

nerve change diminishes.28

(4) Etiology. (a) Specific Cause. - Various theories have been held as to the cause of beri-beri. The most important of these are (1) anæmic theory; (2) rice theory; (3) parasite in intestine theory; (4) specific bacterium either (a) in blood itself or (b) in the soil or dwelling houses. (1) The theory that beri-beri is of the nature of an anemia was disproved by Dr. W. Taylor, who made definite observations on the blood of beriberi patients. He showed that they are not essentially anæmic and, in fact, are rarely anæmic.29 Clinical evidence in Hong Kong also proves that very few beri-beri patients are anæmic. (2) The epidemic in Dublin Asylum, where the patients were fed on a diet in which "rice was little used, practically only as a medical extra," <sup>30</sup> goes far to discredit the theory that the specific cause of beri-beri is to be found in rice. Rice forms a large part of the diet of the Chinese in Hong Kong, but is quite as much used in the interior of China where beri-beri is comparatively rare. Though rice as a staple food is deficient in nitrogenous elements and fats, the Chinese in Hong Kong endeavour to supplement this diet with pork and beef. (3) The theory of intestinal origin of beri-beri has been quite abandoned. (4) There is little doubt that beri-beri is due to a specific germ, the question at issue being now whether, according to Pekelharing and Winkler, the bacterium can live in the blood of the patient, 31 or, according to Dr. Manson, lives only in the soil or dwelling-houses and there produces poison which is inhaled by those residing in the infected areas.32 If one may form an opinion based on clinical

evidence, I would say that a specific germ enters the blood of the patient and there produces toxins analogous in some way to the Klebs-Loefler bacillus of diphtheria. The early high fever in beri-beri seems to me to point to a definite stage in the life of a specific bacterium in the blood. The incubation period, I would say, is as short as three weeks, but

may be much longer.

(b) Predisposing Causes.—Race: In Hong Kong there seems to be no racial immunity from beri-beri, as Europeans, Japanese, Indians and Chinese are Age: As has been already shown, the attacked. average age of beri-beri patients treated in connection with the Alice Memorial Hospital was 30.87 years, but I venture to say there is no age immunity. Sex: Among adults the male sex is most readily attacked, the number of female cases being comparatively small. Parturient women, whether from weakness or through presenting open wounds, are specially liable to be affected. Occupation: Coolies, carpenters, cooks, barbers, sailors, and water-police in Hong Kong suffer most from this disease. Previous Disease: A former attack of beri-beri is known to predispose to a second, third, or fourth attack. Often beri-beri seems to follow on malarial fever, dysentery, syphilis, ulcers of the foot or leg, eye diseases, injuries and surgical I have seen several cases in which the patients developed beri-beri subsequent to eye disease. Over-crowding and the Habits of the Chinese-Insanitary Dwellings: Owing to the heavy rents the Chinese herd together and over-crowding is common. The general habits of the Chinese predispose to this as well as to many other diseases. When wet weather comes they will scarcely move from their houses, and thus the atmosphere of the over-crowded dwellingplaces soon becomes vitiated. Their houses are far from clean, and any germ requiring heat, dust and filth for its development, finds these conditions in Hong Kong houses. Even the structure of the houses is insanitary, and in this connection it is interesting to read the remarks of the Medical Officer of Health for Hong Kong in his report for 1897: "In Hong Kong almost all dwellings are about 13 ft. wide (exclusive of thickness of party walls) while they may extend in depth for some 30 to 50 ft., and consist of one long narrow room on each storey, lit only by one or two small windows, except upon the groundfloor, where the whole front is more or less open during the day-time. At the back of this room is a cook-house with smoke hole in the ceiling, while the room itself is subdivided, by partitions of matchboarding 8 ft. high, into a number of cubicles varying in size from 6 ft. by 7 ft. by 10 ft., each of which constitutes the home of two, three, four or more It can readily be imagined that the amount of light which penetrates the interior of these cubicles is infinitesimal, and it is almost impossible for any one who has not ventured into these dwellings to realise the amount of filth and rubbish that will accumulate in them even in a few weeks." 88 The fact, also, that the foundations of most houses in Hong Kong have to be cut out of the hill-side, tends to make them damp and unhealthy. Climate: As mentioned in the earlier part, the damp, hot season, predisposes to the prevalence of the disease. Food: Food deficient in nitrogen and fat is undoubtedly a predisposing cause, and with change of diet much improvement is soon observed. The fact that beri-beri is non-endemic in

the colony is another predisposing cause.

Diagnosis.—This resolves itself into the recognition of the nervous and cardiac symptoms peculiar to beriberi. In atrophic cases, numbness, loss of power of the limbs, irregular feeble pulse, slight ædema over the front of the tibia, and irregular heart in a patient residing in an endemic region, are the symptoms to be looked for. In dropsical cases, severe cedema, associated with numbness, weakness of the legs, absence of albumen in the urine, and pulse irregular, of small volume and low tension, in similar circumstances, warrant a diagnosis of beri-beri. In mixed cases a combination of these symptoms will be noted.

Prognosis.—It is difficult to give a definite prognosis, but generally speaking an atrophic case will get well in two or three months, while a dropsical case may die at any time, death often being sudden. earlier the patient is removed from the endemic area

the more favourable is the prognosis.

Treatment.—The first step is to remove the patient from the place where he contracted the disease, and if possible, place him in a dry, airy house. His diet should then be changed to beans and fat pork—beans possessing a larger percentage of nitrogen and fat than rice. The following prescriptions have been used in our hospitals in treating beri-beri patients:-

		0			
R	Tinct. digitalis				3ii.
	Tinct. ferri perchlor				3ii.
	Acid phos. dil.				Ziii.
	Infusi calumbæ ad				ξvi.
M.	Sig.: A tablespoons	ul thi	ree tin	nes a	day.
R	Liq. Arsenicalis				
	Liq. Strychninæ an	B,			mxxvi.
	Liq. ferri perchlorid	i'			3iss.
	Glycerini				<del>3</del> i.
	Infusi calumbæ ad				žvi.
M.	Sig.: 3ss. t. i. d.				And the
R	Quin. sulph				grs. 60
	Ferri sulph				grs. 36
	Magnes. sulph.				3iv.
	Acid sulph. dil.				
	Sp. Chloroform	1			3ii.
	Aq. Menth. Pip. ad				ξvi.
M.	Sig. : A tablespoon	ful th	ree tir	nes a	day.

R Lin. terebinth. Sig.: To be rubbed into the muscles.

In dropsical cases one tablespoonful of brandy administered every two hours has been found very effective. Should dyspnœa supervene venesection should be tried.

#### NOTES AND REFERENCES.

<sup>27</sup> Case seen 'in Tung Wah Hospital; notes made by resident house-surgeon.

Taylor, M.D.

\*\*British Medical Journal, September 24, 1898, p. 876.

NOTE ON THE MAL-TREATMENT OF MALARIAL FEVER, AND ITS CONSEQUENCES.—B. Mohun Sircar, L.M.S., Calcutta, makes two important statements-(1) That malarial fever first made its appearance in Jessore some three-quarters of a century ago, and that within our recollection it next appeared in the districts of Burdwan, Hughly, Nuddea, and the twentyfour Pergunnas in the latter end of the fifties; whilst later on it spread to Ringpore, Rajshabi, Dinajur, and other districts. This statement would lead one to infer that these parts of Bengal had previously been free of malarial fevers, and that the inroad was an innovation. It would be interesting to know if this statement can be substantiated by any other observer. If true, it is a remarkable piece of medical history, and places parts of Bengal on a similar footing with Mauritius, as examples of recently imported paludism. (2) The second statement, that the poorer people of Bengal suffer in consequence of using patent medicines, can readily be believed. The medicines offered them as "fever" medicines, by patent medicine vendors, contain almost invariably quinine, iron and Epsom salts in one mixture; and as Mr. B. M. Sircar points out, the iron is taken with the quinine when the temperature is high, and the Epsom salts with both when purgation is no longer desirable. Whether the enlargement of the spleen so frequently seen in the riparian districts is partly consequent upon patent medicine taking, as suggested by Mr. Sircar, it is difficult to decide, but that harm is done there can be no doubt.—Ind. Med. Rec., January 23, 1901.

DESTROYING RATS BY CARBONIC ACID GAS .-Dr. P. Apery, of Constantinople, calls attention to a practical means of destroying the rats on board ships, which was incidentally discovered in the following manner:—A case of plague was confirmed on board the steamship Polis Mytilini while in the harbour of Trieste in November, 1899. While the hold was being disinfected no dead rats were found at first, but on removing some barrels of molasses which had become fermented, a large number of dead rats were discovered undoubtedly suffocated by the generation of carbonic acid. Apery suggests that this discovery of accidental suffocation of rats by means of carbonic acid should be utilised by ships on the high seas in the following manner: -The rats should be inveigled into the hold by means of tempting baits, and then killed by suffocation with newly made carbonic acid. The latter could be easily generated from any carbonate, for instance, marble, by the addition of acids, or by means of an apparatus containing solid or liquid carbonic acid. This method is advantageous for the reasons that it arrests decomposition, has no odour, it sinks on account of its weight, and permeates every nook and corner. Its presence can be detected by lowering a burning light, and it can be dispersed by the air pump or ventilation.—Le Progrès Medical, January 13, 1901.

Professor W. J. Simpson, at present in South Africa, and engaged on the Enteric inquiry, has been selected by the Colonial Government for Plague duty in Cape Town.

<sup>&</sup>quot;Beri-beri," by Pekelharing and Winkler, p. 99.
"Studies in Japanese Kah Ké or Beri-beri," by Wallace

British Medical Journal, September 24, 1636, p. 616.

"Beri-beri," by Pekelharing and Winkler, p. 140.

"Tropical Diseases," by Patrick Manson, M.D., p. 238.

Report of Medical Officer of Health for 1897, British Medical Journal, July 23, 1898.

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THE

# Journal of Tropical Medicine

APRIL 1, 1901.

# THE RELATION OF YAWS TO SYPHILIS.

AT the Polyclinic, London, on March 27, Dr. Morgan Finucane, Assistant Medical Officer, Fiji, read a paper on "Fijian Yaws," before the Committee of Investigation on Yaws. Dr. Finucane contends that the disease in Fiji differs in several respects from the types met with in the West Indies, West Africa, &c. Yaws is endemic in Fiji and scarcely any Fijian escapes the disease. The native belief appears to be that unless a child contracts yaws it will grow up weakly and unfit to withstand other diseases, and the Fijian mother does her utmost to induce the disease in her offspring before it has attained the age of two. The probable source of infection is by means of flies which have fed on yaws, or from actual contact with a yaws sore. A true primary sore has never been seen, but it may be represented by what is termed the "mother-yaw."

That the mother-yaw is the primary seat of the inoculation has not been determined, as when the patient is seen to be suffering from a mother-yaw the skin is already covered with an eruption. Dr. Finucane recognises a short prodromal stage, possibly of three or four weeks' duration, followed by clinical characters which resemble and are apportioned by several observers, into three stages, resembling the primary, secondary and tertiary stages of syphilis. Amongst the signs and symptoms are cutaneous sores, attaining a mulberry appearance; condylomatous patches invading the mouth, fauces, palate and anal regions; chronic general adenitis, marasmus, chronic diarrhoea and dysentery, bone affections, and pigmented scars.

Dr. Finucane is firmly of the belief that yaws is a form, or, as Mr. Jonathan Hutchinson puts it, the "parent form" of syphilis. His contentions are partly based on historical evidence, verified by clinical and therapeutic observations. So far as is known, no medical man in Fiji has ever seen a case of hard chancre in a Fijian. The author of the paper holds that the syphilitic poison was introduced into Fiji in the latter part of the 18th or beginning of the 19th century; that the disease took an epidemic form, but after a time settled down to the modified form it is now met with; that the Fijian is protected by being already syphilised by yaws. Mr. Jonathan Hutchinson, F.R.S., joined in the discussion, and brought considerable evidence to bear in favour of yaws being the parent form of syphilis. Dr. Patrick Manson, C.M.G., F.R.S., Dr. Radcliffe Croker, Dr. Colcott Fox, and Mr. Cantlie also took part in the discussion; their speeches showing that they were inclined to dissociate the two diseases, yaws and syphilis. From a scientific, as well as from a practical point of view, it would be well were this disease made the subject of a thorough inquiry. Clinical signs and symptoms we have had in plenty, but something further is wanted, so that this much-debated subject may be settled one way or the other.

We propose publishing the full text of Dr. Finucane's paper and the discussion it created in our next issue.

# SEAMEN'S HOSPITAL SOCIETY. EIGHTIETH ANNUAL REPORT.

THE welfare of the Seamen's Hospital Society is so intimately associated with the success of the London School of Tropical Medicine that its annual report comes to be a matter of keen interest to all students of tropical medicine—in other words, to all tropical practitioners directly, and indirectly to every tropical resident.

Well nigh every British colony benefits directly by the work of the Seamen's Hospital Society, and the School of Tropical Medicine which the Society inaugurated. Scarcely a ship reaches the shores of our most distant colonies the crews of which do not owe something to the beneficent work of the Society; nor in any part of the wide British dominions is there a medical man who is not benefited by the work of the Hospital and School.

We cannot imagine any institution with higher claims on the people of the Empire, whatever their position, than that of the Seamen's Hospital Society. It is a Society the outcome of our maritime commerce, and a necessity from our being "the over-lords of the sea."

The Society's claims for support are on no parochial basis; for wherever the flag flies its work extends and its influence is felt. Let us hope, therefore, that its necessities may be met and its usefulness continued in a manner worthy of the imperial needs to which it is devoted. With this wide and general interest it is well. however, to see that its claims are not lost by virtue of its very extent. A hospital with local interest is apt to more directly appeal to the individual, whereas an institution which it is everyone's business to support frequently suffers from the very universality of its claims. We would suggest that every medical man in our colonies, every harbour master of our colonial ports, nay, every Governor in our colonial possessions, should make it his personal interest to do something in the way of obtaining funds and support for this national institution - an institution in which every one in this Empire is in some way interested, and to which many are directly and deeply indebted.

The number of sick and injured seamen treated at the various establishments under the immediate direction of the Seamen's Hospital Society amounted during the year 1900 to 25,592, of whom 2,400 were in-patients. The ordinary income was £12,421, and the legacies amounted to £6,172. The ordinary expenditure was £18,915, and the extraordinary for building improvements, &c., £354. Paltry sums these appear when the extent of the work and the character of the institution, of which they represent the income, are considered. Let us not forget that our navy exists and our armies fight for the protection of our commerce; but if our purses are open to these forces only, what will it avail us if the men engaged in commerce, for whom they are called into being, are not cared for as they should be; and the diseases which decimate many of our colonies and our sailors are not closely studied and fought, so that they may be ameliorated?

# POLYCLINIC. THE POST-GRADUATE COLLEGE. ANNUAL DINNER.

THE advance of the Polyclinic to a place of high esteem amongst medical men continues with gratifying success. The second report of the institution is before us, and the appreciation of the work done may be gathered from the fact that during 1900 no fewer than 10,391 attendances of qualified medical men were registered. The scheme of the work consists of daily clinical consultations, of clinical lectures, of practical classes, laboratory classes, and several extramural Several general and special hospitals classes. have opened their doors and teaching to the postgraduates attending the Polyclinic, and it may be fairly claimed that a post-graduate institution worthy of the country is in a fair way to success. We hold that the attendance fee is ridiculously small. For one guinea a year the medical man finds in London practically an educational club; a daily centre of instruction and information, with library, reading and club rooms attached. The expenses of a new institution are necessarily

heavy and the absurdly small fee charged cannot be expected to cover the working expenses. The authorities of the Polyclinic believe they have a just claim on the public. Many thousands of patients are seen during the year, and the clinical work is so arranged that the patient has the benefit of not only the consultant in charge, but also of the many experienced medical men who attend the consultations. It is plain, therefore, that the poor directly benefit by the system inaugurated by the Polyclinic; and the better classes benefit perhaps even more directly still, from the fact that the medical men attending them are afforded an opportunity of acquiring the most modern knowledge of their profession and keeping abreast of the times.

The Annual Dinner is on May 22, the Right Honourable Arthur J. Balfour, M.P., in the Chair. The Polyclinic authorities have every reason to expect liberal support, not only from the medical men who have already come forward as bénéficiaires, but by the public and every British practitioner at home and abroad.

# RESEARCHES ON THE PROTEOSOMA IN BIRDS IN GERMANY.

By Dr. REINHOLD RUGE.

Naval Staff-Surgeon.

TRANSLATED BY P. FALCKE.

The word, "Sichelkeime," used by Dr. Ruge and here translated "crescent bodies," refers merely to a sickle shape assumed by Ross's black threads, and not to the true crescent bodies met with in human malarial blood.

During the investigations on the development of malaria parasites conducted by R. Koch, Professor Frosch confirmed the fact that proteosoma, which hitherto had only been found in birds in the tropics and sub-tropics, also existed in Germany. He discovered the parasite in sparrows in the vicinity of Berlin. The transmission to canaries was, however, not accomplished, owing to the infection of the sparrows being too weak.

In October, 1899, however, I found a sparrow which was more strongly infected—there being five parasites in one preparation—and with this bird Prof. Frosch succeeded in inoculating three canaries. In order to discover if the biological condition of the Italian proteosoma with which R. Koch had experimented differed in any way from the German proteosoma, I made experiments with the latter parasites, and the following are the results of my researches.

#### (1) Periodical Occurrence.

Table I. gives a synopsis as to the periodical occurrence of the German proteosoma. On examining this table it will be at once observed that there is a certain similarity between the same and the malaria chart for Wilhelmshaven given by Wenzel.<sup>1</sup>

Mont	h	Percentage of Sparrow found to be infected	Strength of Infection
October, 18	399 .	. 20 %	Usually 1-5 parasites in the preparation. Once 5-10 parasites in the preparation. Twice 10-15 parasites in the preparation.
November	" .	. 16 %	1.5 parasites in the preparation.
December		. 0 %	
January, 19		. 0 %	The same the same of
	"	. 8 %	1.5 parasites in the preparation.
March	,, .	. No sparrows to be obtained	
April	" .	. 27 %	1.5 parasites in the preparation.
May	,, .	. 16 %	1.5 parasites in the preparation.
June	,, .	. 5 %	1.5 parasites in the preparation.
July	,,	No tonoutlestion	
August	,,	No investigations	5
September		. 30 %	1-5 parasites in the infection. Once 22 parasites in the infection.

# II. Morphology and Biology.

(a) Morphology.—In this respect, a distinct difference is only observable in two points: the vermicule formed in the stomach of the mosquito (Culex pipiens, van der Wulf) resembled the vermicules of halteridium far more closely than they do those of the Italian proteosoma, and the crescent forms were also much smaller than those of the Italian proteosoma.

(b) Biology.—First of all, the development of the German proteosoma in Culex pipiens was obtained at

a high temperature (24-30° C).

The development was exactly as described by R. Koch. It is worthy of remark that Ross's germs (black spores) were found fairly often under certain conditions. This was always the case when mosquitoes had fed on sparrows which were suffering from a natural infection with proteosoma. If, however, the mosquitoes fed on canaries artificially infected, the black spores were very rarely observed; again, when the mosquitoes fed on canaries artificially infected by means of mosquito bites, the black spores were also rarely observed.

As I furthermore found brown crescentic bodies in the cysts in the walls of the stomach and forms which are intermediate between these brown crescentic bodies and the black spores, I believe I can confirm that which Ross previously conjectured, namely, that the black spores originated from the crescents.

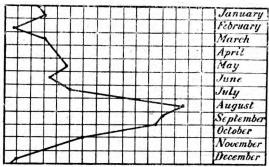
I could not, however, prove whether these represented an enduring or a degenerate form, for at ordinary temperature in hanging drops they remained un-

<sup>&#</sup>x27; Wenzel, "Marsh-fevers," p. 9, Table I.

changed for several months, whereas in an incubator they were transformed in fourteen days into ovi-form bodies. Experimental feedings with the larvæ of

mosquitoes were futile.

The crescents likewise developed at high temperatures, and showed lively mobility which was most apparent in the serum of canaries. In order to observe the transition of the exogenous form of the proteosoma to the endogenous form, fresh prepared salivary glands (containing numerous blasts) in a solution of canary-blood were mixed with serum of canaries. If at 41° C. an examination was made of the contents of the incubator the blasts could be quickly dispersed from the salivary glands by the lightest pressure on the cover-glass. They wriggled about actively between the red blood corpuscles, and burrowed about them, but neither penetrated the same nor clung to their surface. The blasts assumed now the form of a Greek  $\rho$ , now that of the Greek



Course of Malaria in Wilhelmshaven.

letter  $\Omega$  in a lateral position; sometimes they formed a ring so complete that it resembled a small tertian ring, so that I was almost under the impression that I had discovered the long-sought-for form of transition. These rings, however, always again sprang apart, and in them the grain of chromatin always lay in that thick part of the ring forming the blasts, whereas in the ring-forms of the human malarial parasite the chromatin lies opposite to the thickest part of the ring.

The lively mobility of the blast became less after two or three hours and then ceased completely. They were generally fairly capable of resistance to transitory injuries. For instance, if dried up at 37°, and only again floated after five minutes they were still mobile. They could even withstand a short drying at 60° C. An addition of ½ per cent. formalin had no effect on their mobility and only the mixing of glycerine with the formalin caused them immediately to be immovable.

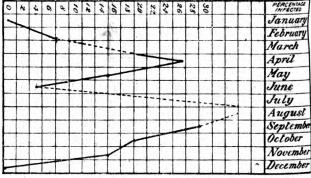
able.

After it had been confirmed that the development of the German proteosoma in the mosquito at high temperatures took place regularly, and that, under some circumstances the blastic germs were already extant in the salivary glands on the seventh day, it was decided to find out at what degree of warmth—counting downwards—a development of the German proteosoma could still take place. From this experiment

it was proved that at a mean temperature of 20° C., provided the temperature was maintained between 16° and 24° C., the development of the cysts in the stomach of the mosquito was already delayed. For instance, the cysts, six days after the infection, were only double the size of a red blood corpuscle. Branch cysts were not observable. The further development of the cysts was irregular when the temperature varied between 15° and 23° C. In that case cysts containing crescentic bodies were still observable on the walls of the stomach eighteen, twenty-eight, and even thirtyfive days after the infection, and empty cyst walls were also observed. Often the cysts which had proceeded to develop daughter cysts were permeated by vacuoles and degenerated, the middle lobes of the salivary glands being choked with blasts. The latter were partly mobile (eighteen days after the infection), partly immobile (forty-five days after infection).

The blasts developed between 16° and 24° C. were at first normal and virulent, as transmission to birds proved. If, however, the infected mosquitoes were kept in captivity and examined forty-five days after the infection it was found that, in a few, the blasts were still mobile, therefore living, and in others immobile, therefore dead. It therefore appears that only a portion of the blasts can remain alive longer than about six weeks in the salivary glands of

the mosquitoes.

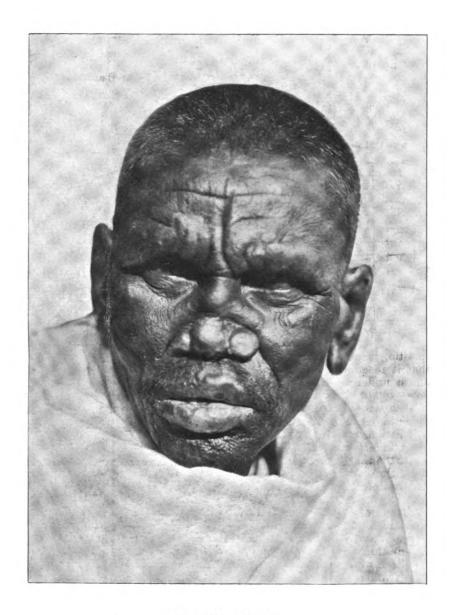


Course of Proteosomal Infection in Sparrows.

In this respect the table of the proteosomal infections gives an indication but no settled reply. From February to April the curve rises rapidly. At this time the mosquitoes (Culex pipiens) leave their winter quarters in increasing numbers, so that at the end of March, in Central Germany, no more mosquitoes are to be found in their winter quarters. The mosquitoes sting because they require blood to develope their previously fertilised eggs. These winter-gnats must therefore be responsible for the infection of the sparrows; for the proteosomal infections observed from February to April cannot be due to relapses, for one attack provides immunity.

 $<sup>^{1}</sup>$  Average temperature 24.5° C., and on the second day a minimum temperature of 20° C.

For this reason one can never say in advance if one is able to infect a wild sparrow newly caught by injecting proteosomal blood, for it is impossible to know if the bird has already gone through a natural proteosomal infection and has thereby acquired immunity. As to the results of my injections of blood containing proteosoma into wild sparrows, the old birds never became infected, the young ones rarely, and even then—with one single exception—the infection was very weak.



A LEPER'S HEAD
Showing markedly the loss of Nasal Cartilages.

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The infection must therefore be a fresh one. Besides, between February and April the mosquitoes do not find the temperature necessary for the development of the parasites which they may have imbibed by sucking the blood of sparrows. For, as proved, the proteosoma do not develop in the stomach of the mosquito when the temperature is between 16° and

We must therefore take it for granted that part of the blasts go through the winter, and this opinion is borne out by the further course indicated on the table. The number of cases increases considerably in May and June. At this time the new generation of mosquitoes developes and, according to the conditions of temperature, the winged insects appear towards the end of April or middle of May. From that time to the end of June the temperature is as a rule not quite high enough to develope the proteosoma in the mosquitoes. Therefore the second batch of infections is conjectured to occur in August.

In conclusion, I may remark that the illness of canaries had a varying course, according to the manner of infection. When blood containing proteosoma was injected the typical course of disease, lasting twelve days, as described by Koch, was the result; if, however, the birds were bitten by infected mosquitoes (Culex pipiens), no matter if by one or several, the disease ran a chronic course and lasted on an average four weeks. In these cases, though at times 60 per cent. of the blood corpuscles were infected, the birds did not die; the birds treated with injections of blood often succumbed to the infection.

# THE NEW PROPHYLAXIS AGAINST MALARIA.

An Account of Experiments in Latium.

By Professor Angelo Celli.

THE modern theory of the propagation of malaria by means of mosquitoes had scarcely been confirmed experimentally, when, in my lectures in May and June of 1899 and shortly afterwards in book form, I gave an exposition of the new epidemiology and the prophylaxis following from it. This, I pointed out, in order to be completely successful must be directed against (1) the causes bringing about infection, either by (a) destroying these (by disinfection of the blood of malarious persons and by the destruction of mosquitoes) or (b) by preventing their entrance into the human organism (by protection of dwelling houses and of the exposed parts of the body); and (2) against the predisposing causes (organic, physical, and social). In view of the arduous nature of any attempt to battle against the latter set of causes, I endeavoured (even before the commencement of the malarial season of 1899) to put into practice those only of the prophylactic measures which have for their aim the suppression of the direct causes of the epidemic, that is to say, the causes bringing about infection. I was even then persuaded, and am now more than ever convinced, that a complete and certain prophylaxis by disinfection of the blood by means of quinine is practically impossible, although Koch, and later Gosio, and at first Grassi also, believed in its efficacy. And I had likewise come to the conclusion through my own and Casagrandi's researches<sup>2</sup> that, although the destruction of the mosquito in the aquatic and the aërial stages of its existence is in itself not a difficult thing, this is not practical on a large scale, chiefly because there is not the same immediate material advantage in killing insects which are injurious to man that there is in destroying those which are injurious, for example, to the grape-vine.

My first prophylactic experiments of 1899 had consequently for their object the testing of the means best adapted to prevent the bites of mosquitoes and the resulting penetration of the malarial germ into our On one hand, I made experiments with various substances, such as ointments, soaps, and odours, calculated to drive away mosquitoes, and satisfied myself that they were of little use, even the best of them, as, for instance, those with turpentine for their basis, either because of their ephemeral effect, especially in the open air, or because of the negligence of those employing them. On the other hand, I adopted the method of mechanical protection of the houses and of the exposed parts of the body, not omitting at the same time the disinfection of the blood by an assiduous attention both to relapses and to primary fevers, and the destruction of any mosquitoes which might accidentally penetrate into the houses. It will be well to refer here once more to the experiment which I made in the æstivo-autumnal season of 1899 on the two railway lines, notoriously malarious, of Prenestina-Cervara and of Pontegalera. I shall therefore give a brief résumé of the official report dated December 13 of last year. Of the firstmentioned of these two lines we selected for experiment the linesmen's cottages numbered 4, 5, 6, 7, and 8, and on the second those numbered 19, 20, and 21. We covered the windows with frames of tulle,3 thus allowing air and light, but no mosquitoes to pass. At the top of the staircase a door with a similar frame was placed, the better to protect the bedrooms. This door as well as the outer ones, was made to close automatically so as not to demand too much of human apathy. The entrance door, as being more liable to injury, was furnished with wire gauze instead of muslin. We advised the inmates to sleep with the windows open so that the air, filtered as it were from insects, might pass in freely. For the protection of persons employed on night duty, we used cowls like those of bee keepers, provided with a circular mask of wire guaze, and having attached to it below a veil

<sup>&</sup>quot;Malaria according to the New Researches" (Longmans, Green, and Co.).

<sup>&</sup>lt;sup>2</sup> Per la Distruzione delle Zanzare, Mem. I. Annalii d'Igiene Sperimentale, vol. ix., 1899.

<sup>&</sup>lt;sup>3</sup>These frames were never removed from the windows of the first floor of cottage No. 19 on the Pontegalera line, and now, two years later, are in excellent preservation. For those who cannot afford metallic frames, the muslin ones may be recommended.

tucked under the coat, at the ends of the sleeves of which very wide gloves of chamois skin were tightly A vigilant outlook was daily kept for sewn on. mosquitoes, in order to find and eventually to capture them in the houses. Every family was provided with a powder for burning in case by any chance a mosquito should make its way in. The neighbouring linemen's cottages and the stations of Cervara and Pontegalera served as controls. On the Prenestina-Cervara line Cottage No. 6 served the same purpose, the inmates being negligent and refractory and allowing mosquitoes to enter constantly. Some of the latter were found infected, so that we were able to predict the epidemic which afterwards developed, attacking twelve out of every fourteen inhabitants. Among the controls on the Cervara line twenty-four persons contracted malaria, and at the station of Cervara, renowned for its malaria, all were attacked. In the control zone of Pontegalera, two persons who had acquired immunity from having had the disease previously escaped infection. On the other hand, in the linemen's cottages which were protected, out of twenty-four persons four were attacked, but these were on night duty and took no heed of our instructions. Three of them were ill for a long time, two from tertian, spring and autumn varieties respectively, and one from quartan fever. In spite of quinine administered promptly and abundantly, they relapsed several times, and their blood contained a large number of gametes—that is to say, of those parasitic forms most dangerous for contagion. At the same time their wives and children living in the protected houses along with them enjoyed immunity from the fever. The disease did not therefore spread through a whole household in the usual way, and for the first time since the construction of these lines of railway, the families of the railway servants were able in highly malarious localities to pass the whole summer and autumn in the Campagna without contracting fever.5

The result of these experiments, which were the first of their kind in malarial districts, very greatly impressed Manson, who came to see my field of experiments at Cervara, and they induced the directorate of the Adriatic Railway Company to extend the system in Latium from Prenestina to Salone and on the Catelgiubileo line, and also into Southern Italy near the station of Ofantino in the Province of Foggia.<sup>8</sup> The Southern Railways Company in its turn determined to extend the same experiments to the most malarious of the linemen's cottages on the lines of Terracina, Anzio, and Pontegalera, here in Latium, and to those near the station of Albanella in the province of Salerno. The conduct

of the former of these two experiments was entrusted to me; the other, in Southern Italy, to Grassi, who was member of a consultative committee appointed for the purpose by the same railway company.9 In like manner the Sicilian railways have also extended to the sections of their lines lying in malarial zones the same system of prevention. I must, however, limit myself to an account of the result of the new prophylaxis as obtained in Latium, where, encouraged and taught by the experience of last year, I attempted to defend against malaria in the season which is now drawing to a close, not only the railway servants, but also the caretakers in the Campagna, and the peasants. I shall now briefly recount what I did for each of these, and the results which I obtained.

# A .- PROTECTION OF THE RAILWAY SERVANTS.

The method employed was that of the previous year, with the difference that wire gauze10 was everywhere substituted for the muslin, and that a large cage of wire gauze was placed in front of the door so as to form a kind of porch or ante-chamber. addition of a porch, first suggested by Dr. Blessich, is very useful in giving greater protection to the rooms on the ground floor, and affording a shelter where in the summer the family can have the benefit of the open air without actually going outside. As a rule, the doors were made to close automatically, and to make sure that no mosquitoes entered by the chimneys the latter were also covered by gauze with a wider mesh. To render easier the discovery and destruction of any mosquitoes that might chance to enter, the walls of the rooms were whitewashed.

Large and repeated doses of quinine had been administered to any persons who had had relapses in the spring, as well as the very few patients with primary infections, the treatment being completed in all cases with arsenical and ferruginous preparations. No prophylactic medicine was given, except to those on night duty on the Adriatic lines, whom I had not been able to induce the previous year to wear regularly at night time the special head-gear and gloves provided for the purpose. They were made to take equinine in a daily dose of from 0.50 to 0.75 centigramme. On the Mediterranean lines we had not the same difficulty, because there mosquitoes and other insects are so numerous as to cause intolerable annoyance, apart from any danger of their conveying fever. The results which we obtained were briefly as

(1) Prenestina-Salone line. On this line we this year protected also the houses on the Cervara-Salone section which last year served us as controls. We were able, however, to use for this latter purpose the intermediate stations of Cervara and Salone as well

<sup>&</sup>lt;sup>5</sup> Vide Bollettinoon, 3 della Societa per gli Stud della Malaria, Sitting of February 5, 1900. <sup>6</sup> Brit. Med. Jour., February 10, 1900. <sup>7</sup> A very pleasing sequel to this visit was the experiments of Dr. Sambon and Dr. Low, who, in order to obtain documentary evidence, as it were, of the efficacy of the new prophylaxis, came and passed the malaria season on the most deadly spot in Ostia in a hut protected against mosquitoes, and who, together with two other persons, have remained all the time in perfect health.

\*Dr. Martirano, who has carried out the prophylactic experi-

ments at Otantino on twenty-eight persons, has not had a single case of primary malarial infection to report.

Professor Grassi published before the season had come to an end an anticipatory report, and this without any hint that others had been working before and were still at work for the

railway company, and for the Society for the Study of Malaria, by whom the funds were supplied.

10 The diameter of the mesh of the gauze should not be greater than two millimetres at most; this size prevents the entrance of any but a very small culex. To exclude all sizes of mosquitoes with certainty, the mesh should have a diameter of only from 1 to 1.5 millimetres. A cost of vernish is applied to pressure 1 to 1-5 millimetres. A coat of varnish is applied to preserve

as the section beyond, from Salone to Lunghezza. Now in the zone which was protected, out of fifty-two persons only two contracted fever-namely, a watchman on night duty, attacked on June 15 (before the commencement of the prophylactic treatment of those engaged in this dangerous service) and a woman attacked on October 15, who had always shown herself refractory to our recommendations. The watchman, notwithstanding abundant and repeated doses of quinine, had had three relapses at long intervals; nevertheless, his malaria did not prove infectious to the other seven persons who lived in the same house. In the rest of the protected zone fifty persons (twentyone adults and twenty-nine children) remained free from fever. On the other hand, in the zone of control, two out of three persons sickened at the station of Cervara, sixteen out of eighteen on the Salone-Lunghezza section, six out of ten in the station of Salone—the four who escaped having been in the habit of frequently sleeping at Rome—and in the houses of the country people along the protected portion of line, and in the huts of Salone there were about 100 peasants, all of whom sickened. Also on the farms of Rustica, Cervelletta, Bocca di Leone, and Gottifredi all, or nearly all, took the fever. Our protected zone thus remained almost free from malaria in the midst of a fever-stricken region, and in order to render healthy a district where during the preceding year everyone had had fever, it sufficed to extend to it the new method of prophylaxis.

(2) Castelgiubileo line (from the seventh to the nineteenth kilometer inclusive). On this line the experiment succeeded in a degree highly convincing. Here there are two types of linemen's cottage—the new and the old; the latter from its peculiar construction does not lend itself to being protected, and was therefore left to serve the purpose of control. This turned out to be a fortunate circumstance, because the old and the new cottages as nearly as possible alternate with one another. Now in the protected houses, out of fifty-seven inhabitants not one took fever, while in the unprotected houses, out of fifty-one inhabitants only seven escaped, and these were nearly all adults, immune in consequence of previous attacks. Among the children, on the other hand, only two out of twenty-nine escaped infection in the unprotected huts, whilst of the thirty-six children in the protected houses not one was attacked. We also made two further control experiments. On August 23, it became necessary, for reasons connected with the railway service, to transfer a family consisting of a husband, wife and son, from cottage No. 17, where they had always enjoyed good health, to the next cottage, No. 16. About a month afterwards the wife and child were attacked by fever. On the other hand, a family consisting of husband, wife, and six children, all of them suffering from malaria, had been placed in cottage No. 17. We at once put them upon a full and prolonged course of quinine followed by tonic treatment with arsenic and iron. Secure in there protected house from the baleful mosquito, this family has made an excellent recovery, although their convalescence and cure had to go on through the height of the malarial season. Only one of the children, in whom the relapses were more obstinate,

still remains in somewhat poor condition. On this Castelgiubileo line the proof of the value of the new prophylaxis has thus been most decisive and eloquent. Of a whole community of persons all subjected to the same conditions in other respects, those whom we defended against mosquitoes have remained free from fever, whilst those left unprotected have nearly all been attacked. It is as if we had a book with its pages alternately white pages corresponding to our protected houses and families, the black representing those left unprotected. No less decisive in their results were the experiments made on the other lines.

(3) Pontegalera line. Here, in the section outside of the protected zone, cottages Nos. 15 to 19 inclusive, out of forty-two railway servants, only three escaped the fever. In our protected zone, on the other hand, out of thirty-six persons only two contracted it, while in the section further on from the twenty-seventh to the thirty-third kilometre, out of ten persons only one remained unattacked. As further controls we had the station of Pogtegalera placed almost in the midst of our zone of experiment, where out of seven persons six were attacked; the first lineman's cottage on the Fiumicino railway, where all of the three inmates suffered, and some neighbouring country cottages in which at Chiesola thirty inmates out of thirty were attacked, at the hamlet of Pontegalera four out of four, and at a house placed almost midway between two of the protected railway cottages, twelve persons out of twelve.

(4) The Anzio line. Here we selected-for protection, the two cottages most noted for malarianamely, those at the twenty-fifth and thirty-second kilometre. Now in these two cottages, in each of which were four persons, all remained perfectly well, and four other persons, who came from the Terracina line to live in them suffering severely from malaria, recovered their health completely. On the other hand, in the cottages from the eighteenth to the twenty-third kilometre, out of thirty-nine inmates thirty-eight sickened with fever; in the cottages lying between the two protected ones nine out of nine; and in those beyond our No. 32 cottage eight out of ten. Among a squad of linemen numbering six there were four fever patients, the two who escaped belonging to the family protected by me at the twenty-fifth kilometre.

(5) The Terracina line. In the railway cottages along this line, so terribly malarious, I had thirty persons protected between the station of Frasso and Terracina. Of these only two suffered from primary infections-namely, a lineman who by mistake went on night duty without his mosquito hood, and a little girl who had had quartan fever. In two persons who had become malarial cachectics during the previous two years æstivo-autumnal attacks recurred with obstinacy up to the first few days of October, in spite of treatment. None of the others had malaria. On this line also I was able to establish a series of controls analogous to those I have described on the Castelgiubileo line by leaving here and there cottages unprotected. Of thirty-seven persons inhabiting these latter thirty-five took fever.

To sum up, of 207 railway employés subjected to the new prophylaxis against malaria during the seasons 1899 and 1900 only ten contracted fever, although they were living in the most unhealthy regions of Latium and in the midst of their fellows, all or nearly all, of whom were stricken by the disease. Also, in houses defended against the invasion of mosquitoes, malaria loses its contagiousness and no longer gives rise to the usual epidemic. Further, the treatment of, and convalescence from, malarial fever, can be carried on in malarious localities, in houses protected from the invasion of mosquitoes, quite as well as in places where the air is good.

It is to be noted, in conclusion, that this favourable result was obtained with the utmost simplicity, all that was necessary being a little persuasion with a small present, and the supervision which I and two railway officials who assisted me, one on the Adriatic and the other on the Mediterranean railways, were able to exercise. A similar result could therefore be attained wherever and whenever desired, and I am able to say that these two railway companies propose to secure

it on the largest possible scale.

#### B.—PROTECTION OF THE CARETAKERS IN THE CAMPAGNA.

Two Roman companies—namely, the Societa dell' Acqua Marcia and the Societa dell' Elettricita—have each a caretaker's house on the road from Rome to Tivoli, both situated in localities with a bad type of malaria which has hitherto attacked familes residing in them every year; or rather, I should say, the wives and the five children, for the husbands, owing to many years of past suffering from the disease, have become immune. This year for the first time the wives and children have escaped infection, and this immunity they owe to my having had their houses protected before the malaria season, in the same way as those of the railway people, with wire netting. As I had here to deal with persons of intelligence who could be trusted to carry out my instructions carefully, I left this experiment to proceed, as it were, of its own accord. At the beginning of the season I went with the companies' engineers, first to order, and then to approve, the protective arrangements for the houses. I gave the requisite instructions (to remain indoors from an hour before sunset till an hour after sunrise, and to kill any mosquitoes that might accidentally gain entrance) and after that I did not return. From the engineers, however, I have from time to time received news of the welfare of these people, together with thanks for the danger escaped. The same protection may thus be secured whenever they desire, by all the caretakers of the communal, provincial, and Governmentaroads, of monuments, and of the works for reclaiming waste lands in the many malarious districts of Italy.

# C.—Protection of the Peasants.

Malaria rages most of all among the field labourers, working as these do in the most dangerous hours of the evening and night at the most unhealthy time of year-namely, when the principal crops are reapedliving in habitations of a wretched or defective kindor without any habitation whatever—and withal very insufficiently clad. Such conditions render it very difficult to carry out among these people the pro-

phylactic measures which would be, and ought yet to become, of the greatest benefit to them socially. I wanted notwithstanding this to make the attempt. Accordingly, I protected in the usual way, with nets over the windows and doors, the farm of "Le Castella" and about half of the hamlet of the "Cervelletta." Among the houses so protected on the latter farm was one with a terrible reputation for the number of victims which malaria had yearly claimed from it, so that the proprietor wished to shut it up. Below this house, in which two families (six persons) were going to live, was another, a sort of tavern, which I also protected with the netting. And, finally, I determined to make the same experiment with that most primitive of all human habitations, the straw hut, closing thoroughly with straw all the holes in its sides, and with wire gauze the openings for allowing the smoke to escape; I placed at its entrance a big cage of the same material, furnished in its turn with two doors made to close automatically. I protected three huts in this way, two at the Cervelletta and one at the Castella.

It is more difficult to induce half-educated people to believe that malaria may be conveyed by the bites of mosquitoes than it is to convince the ignorant peasantry of the fact. On this account I met with much less difficulty from some of the more intelligent among the latter than I had expected in getting them to carry out the new prophylaxis so as to insure

success.

In the hamlet of the Castella, the family of the manager and the medical man of the Red Cross Society escaped infection, notwithstanding that some stagnant water from a ditch, which was brought in the house in an old cask, might have developed many mosquitoes. So also the seventeen Lombard peasants who slept in the protected part of the hamlet of Cervelletta were rewarded for the great care they took by only one of their number falling sick with malaria, a man who was in the habit of getting drunk from time to time, and while in this helpless state, of sleeping in the open air. In the part of this hamlet which served as control, we had at the same time ten cases of primary infection and several relapses from the previous year's epidemic. And the house so cursed with the disease in former years had no fresh cases in it. One family was, however, obliged to leave its protection in the early days of September, and now (between October 15 and 17) the two children have already contracted fever.

In the midst of the other straw huts all stricken with malaria, the protected hut at the Castella, with a family, consisting of father (a very industrious man), mother and three children, remained, wonderful to relate, quite free from fever, as did also one of the protected huts at the Cerveletta with five inmatesfather and mother and three children. In this latter hut we never found mosquitoes; a few which found their way as far as the outside cage were killed. On the other hand, in the third protected hut, notwithstanding all our warnings we found mosquitoes in the cage every morning and also often inside the hut itself. Finding it impossible to induce this family, on account of their apathy or their ignorance to take the necessary precautions, we removed the protection,



and three out of four of the inhabitants took fever. Thus, so long as the peasants were careful, they were able to defend themselves from malaria even in the

most primitive of dwellings, the straw hut.

In order to protect from fever the nomadic rural population who come down to the Campagna at the season when the most dangerous kind of work is in progress, and who are easily infected on account of their sleeping in the open, the Caetani family are making a preliminary trial in the Pontine Marshes of a large hut constructed of wood and wire-gauze which can be taken to pieces and transported to wherever it is wanted.

Naturally, in order to make quite complete what we may call this mechanical prophylaxis, for the peasantry it would be necessary to stop their work in the more dangerous hours. Besides this, one must not lose sight of the ideal kind of prophylaxis for people who work—namely, that of making them artifically immune against the disease. With this object in view I have made, and continue to make many experiments, especially with euquinine, and I propose shortly to give an account of the results obtained by this medicinal method of procuring immunity. For the present I wish to insist upon the fact that by means of the mechanical prophylaxis for malaria (protecting the houses and the uncovered parts of the body) a great step in advance has been made for practical purposes. Among railway employés, caretakers and even the peasants of the malarious Campagna, the lesson of the last two years has been so persuasive that all of those who have hitherto served as controls are anxious to be protected during the next fever season. Within no very distant date all houses in malarious localities will be defended against the entrance of insects; thus during the day there will be no inconvenience from flies and other insects of an unclean, troublesome, or injurious kind, and at night there will not be the annoyance and evil effects of mosquitoes. In all low-lying, warm, moist, places, where myriads of insects of every species swarm, this mechanical means of defence against their invasions will become the best of the prophylactic rules for the prevention of malaria and other diseases.—Specially translated from the Supplemento al Policlinico Anno VI., No. 51, for the Civil and Military Gazette.

[This is the best translation of Prof. Celli's work we have seen, and we are indebted to Major P. W. O'Gorman, I.M.S., for drawing our attention to

it.—ED.].

### Current Miterature.

### CHOLERA.

EXTRACTS FROM THE PAMPHLET ON PRECAUTIONS AND SUGGESTIONS FOR THE PREVENTION AND CHECK OF CHOLERA, BASED CHIEFLY ON PROFESSOR HANKIN'S BOOK, "CHOLERA IN INDIAN CANTONMENTS." By Colonel Duke, I.M.S., Principal Medical Officer P.F.F., Abbottabad.

This valuable code of rules, drawn up for the use of medical officers as well as the laity by Colonel Duke, and revised by Professor Hankin, should be widely distributed in India and elsewhere. It is the best practical guide how to ward off cholera we know of. We should have liked to publish the entire pamphlet, but the extracts we give will show the useful nature of the communication. Copies of the pamphlet are obtainable at The Punjab Frontier Force Press, Abbottabad-Punjab. Price 3 annas.

(1) The cholera microbe, outside the human body, so far as is known, only lives and reproduces in water.

(2) It is one of the easiest microbes to kill by antiseptics or by long exposure to sunlight.

(3) It is rapidly and easily destroyed by boiling.

(4) Boiled water is absolutely safe.

(5) Two or three minutes' real boiling is sufficient.
(6) The cholera microbe is rapidly destroyed by drying. Hence mattresses and clothing, supposed to be infected, should, when possible, be exposed to sunlight in the open air for some hours before washing.

(7) It is readily killed by acids; hence the utility of acid drinks as a means of preventing infection.

(8) In cholera times soldiers should be encouraged to drink aerated water. Further, the addition of 10 drops of diluted sulphuric acid to each bottle of lemonade before bottling during a cholera epidemic has been recommended.

(9) Cook house floors should be daily washed with permanganate of potassium solution. Strength, half

an ounce to each bucket of water.

(10) All wells must periodically be disinfected by permanganate of potassium; say, roughly, one ounce to every three feet in depth of water. If possible, the permanganate should be added at night in order to leave the wells undisturbed as long as possible. The water will be fit to drink on the following morning. If at this time the water has a red colour, it will have a slightly unpleasant taste, but it is perfectly harmless. If the inhabitants do not like the taste they should be instructed to pump out the water until the colour vanishes. This treatment should be repeated once a week.

(11) In cantonments, on the other hand, to each well should be added, firstly, 5 lbs., more or less, of hydrochloric acid. When this has been mixed with the water, an equal amount of permanganate may be added and mixed by means of a chursa. After a few hours the water may be pumped out until the colour has almost vanished. This may take one or

two days to do.

(12) The mixture of permanganate and hydrochloric acid, at the moment of mixing but not after, liberates nascent chlorine ozone, &c., and hence is one of the strongest antiseptics known; and is believed by Professor Hankin to be powerful enough to kill the enteric microbe in a well.

(13) The above procedure is not suitable for villages (a) for obvious reasons, (b) because the addition of a liquid to the well water hurts caste prejudices. A purely Mahomedan village would probably raise no objection. Owing to the existence of caste prejudices, it cannot be expected that Hindoo villagers will allow a Mussulman Hospital Assistant to put permanganate in the wells from

which they obtain their drinking water; therefore an Englishman should always be employed to do this work. During the famine of 1896, all the wells at a certain relief work were permanganated by the Babus in charge, and the starving people remained free from cholera. The Babus, however, did not put permanganate in the well used by themselves; they were accordingly attacked with cholera, and most of them died.

(14) After a well has been thoroughly disinfected, no *outside* vessel should be lowered into the water, one *special zinc* or *iron* bucket *only* should be used

to draw up water.

(15) It is advisable, where possible, to have a special permanganated well for bathing and washing clothes, otherwise infected water might be used for

the purpose.

(16) All mussucks, packals and dhols should be paraded and disinfected with a strong solution of (a) carbolic acid, strength 1-20, or (b) of permanganate of potassium, say for mussucks 2 to 4 drachms (5ii. to 5iv.), two to four tea-spoonfuls; for packals 4 drachms to 1 ounce (5iv. to 3i.), one to two table-spoonfuls; for dhols 2 drachms (5ii.), two teaspoonfuls. A hot solution should be used, and the skins shaken occasionally from 6 p.m. to 5 a.m.

(17) Earthen vessels containing milk, dahi or curds require special attention. Chatties and surahis used by soldiers for holding drinking water should be abolished during cholera times; at other times they should be broken or replaced once a week. It is advisable to abolish the use of porous earthenware vessels altogether. The only reason for employ-

ing them is their cooling effect on water.

(18) Should cholera hang about a cantonment it is advisable to have a parade of *all* vessels used for storing water, milk, or food outside each quarter, both married and single. Under medical supervision such vessels are filled with strong disinfecting solution, and kept outside for a period of eight to twelve hours, say 7 p.m. to 5 a.m.

(19) Regarding its origin, an outbreak of cholera is almost invariably traced to tainted water or

watered milk.

(20) At the outset, the discovery of the (locality of the microbe) source of infection is of vital importance. If the microbe can be traced and destroyed the removal of the troops is not so essential as was formerly supposed and authoritatively laid down. In July, 1894, during the dreadful outbreak of cholera in the East Lancashire Regiment that occurred at Lucknow, Professor Hankin found the cholera microbes in the filters which were strongly affected. These filters were carried with the regiment into camp, continuing to deal death and destruction.

(21) Regarding the continuance of cholera in a camp for a day or so after the first removal, it must be borne in mind that the incubation period in the majority of cases is considered to be from forty-

eight to seventy-two hours.

(22) Barracks and huts in which the floor or walls have been soiled with dejecta or vomit, as often happens, should be covered or brushed over with a strong solution of carbolic acid commercial, 1 part in

20 of water, after their vacation, and then left alone. Whenever doing so will not involve the risk of fire, earthen or cement floors are preferably disinfected by covering them to a depth of two or three inches with straw, sticks or other inflammable material and setting light to it. Cowdung floors are not affected by carbolic acid, and should be treated either by burning, or by a solution containing 1 in 1,000 of sublimate of mercury, and 2 in 1,000 of hydrochloric acid.

(23) If the digging of floors is done at once, as was formerly advised, those engaged in the removal of the

soil are liable to infection.

(23a) In damp localities, especially where cholera is epidemic, the microbe may exist for long periods in black stagnant mud near puddles. Natives using such mud to scrub their lotas may carry infection to their food or to a well. The level of such damp places should be raised by covering them with clean dry earth. If near cookhouses carbolic acid may be used in quantity. But such stagnant mud is difficult to disinfect, and ordinarily more reliance should be placed on the effect of draining and raising the level.

(23b) A supply of carbolic powder should be provided for latrines. This may not be a strong antiseptic, but its action is that of a smelling substance that remains on the surface of the soil, and hence

discourages flies.

(24) The dejecta of cholera patients are dangerous because they contain the microbe of the disease. Therefore the bhistic should never be allowed to come into a hospital to aid the sweeper cleaning up cholera dejecta for fear his mussuck should get contaminated. All stools should be disinfected by carbolic acid commercial 1 part, to water 20 parts.

(25) Attendants on cholera patients whose hands and persons are soiled by dejecta or vomit, should most carefully wash their hands and arms in a strong disinfectant before taking food. Men told off to attend the burial or burning of corpses should be equally careful. The touching even of the moustache with unwashed hands when attending a friend or

comrade may cause fatal results.

(26) A special sweeper, who must do no other work, should be told off for the kitchen or kitchens. His broom should be kept hung on a nail outside the door of the cookhouse. It is most important that the broom used in the cookhouse should not be used for cleaning latrines or objectionable filth. It is wiser still to exclude the sweeper altogether from the kitchen, and insist on the cook cleaning his own kitchen. In the Bombay Presidency, it is usual to have a special servant for such work known as the "hamal."

(27) The floor of the cookhouse must be daily

washed with permanganate.

(28) Before entering a cookhouse, the cook and musalchi should be made to wash under special supervision. They should put on clean clothing or dhoties that have been boiled or dried in a hot case. Their other clothing should be left out in the sun.

(29) Dishes and plates should be washed in boiled water, with the addition of a cupful of diluted sul-

phuric acid to each bucket.



(30) Water should be boiled in locked tins with a tap, and not filtered afterwards.

(31) Milk and all kinds of food must be carefully

protected from flies.

(32) Caution is here repeated against uncooked vegetable, salads, cucumber, &c., that may have been washed or stood in infected water. The only safe food is food that has just been cooked, owing to many loopholes of infection-hands of cooks, flies, washing-up water utensils, &c.

(33) Jharans, or dishcloths, should be well dried every day. This can be conveniently done in a hot

(34) The musalchi's mop should be cremated. Either a new mop should be given him daily for washing the plates, or a pair of tongs with sliding rings with which he can hold a dishcloth for the purpose. After use the dishcloth can be removed from the tongs, cleaned and spread in the sun to dry.

Indian expressions used in above article. — Dhol=an iron bucket; chursa=a butcher's knife; mussucks=water vessels, made of hides and carried by bhisties=water carriers; packals=mussucks carried by animals; lotas=brass vessels; musalchi =cook's assistant; dhoties=loin cloths.

### PLAGUE.

Some Practical Notes on the Bacteriological DIAGNOSIS OF HUMAN PLAGUE (PESTIS HOMINIS), BY SHERIDAN DELÉPINE, M.D. — This article (Indian Medical Record, January 9, 1901) is, according to the author, based on experiments carried out in his laboratory with a culture of bacillus pestis kindly given to him by Dr. Calmette in April last. This culture was used chiefly for the purpose of repeating experiments of previous observers, Yersin and Kitasato more especially. The culture had been obtained by Dr. Calmette from a case of plague in Oporto (1899), and was so virulent in April last that it was sufficient to prick the skin of a guinea-pig with a needle loaded with bacilli to produce an attack of the disease fatal in about five days.

Having first touched on the discovery of the plague by Yersin and Kitasato in Hong Kong during 1896, the author next discourses on "Types or varieties of plague;" he considers the varieties depend (1) on the channel of entrance, (2) the virulence, and (3) the quantity of the bacillus. Dr. Delépine

differentiates five types.

(1) The bubonic type. (2) Septicæmic plague. (3) Pulmonary form.

Intestinal form. (5) Cutaneous form.

As to the diagnosis of plague by experimental infection, the observer used two methods for this purpose:-

(1) Subcutaneous inoculation, for which mice and

guinea-pigs are especially suitable.

(2) Infection through the air passages, obtained by painting the nostrils with the products under investi-gation. This method is specially suitable when products of low virulence are under investigation -- as for instance, the pus of suppurating buboes. (In suppurating buboes the plague bacilli, when found, are usually in a state of degeneration and frequently of low virulence.) For this method of experimental infection the guinea-pig is specially suitable.

Dr. Delépine suggests that in practice microscopical

examinations should be initially made:-

(1) Of material obtained from a bubo or from the cedematous tissue surrounding it.

(2) Of blood obtained from the tip of a finger or

from the lobe of the ear.

(3) Of the expectoration in suspicious cases of

pneumonia.

Such an examination presents no difficulties and can be quickly carried out. Almost any of the aniline dyes in common use can be used for the purpose of staining cover-glass preparations of material obtained with the hypodermic syringe from buboes or their neighbourhood. Freshly prepared aqueous solutions of methyl violet, aqueous solutions of methylene blue, or Loeffler's blue may be used.

Dr. Delépine devotes a paragraph to "Cultivation of the Bacillus," and concludes his careful and interesting article with "Precautions against Laboratory Plague," which though mentioned last is of primary importance, for many investigators, in the excess of their zeal, forget the danger of their work

and recklessly expose themselves to infection.

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# The Journal of Tropical Medicine.

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In order to meet the constant enquiry for addresses of respectable firms catering for the various requirements so difficult to obtain abroad, we give a list of names and addresses which we trust will be found useful to our numerous correspondents and subscribers.

### Original Communications.

# A CASE OF ACUTE LYMPHATIC LEUKÆMIA SUPERVENING ON MALARIA.

By J. Preston Maxwell, M.B., B.S., F.R.C.S. Changpoo, Amoy, China.

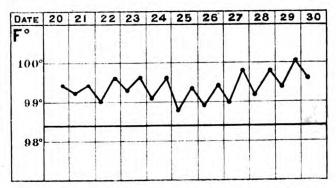
Manson, in his work on "Tropical Diseases," uses the following words: "It is probable that splenic leukæmia is in some instances a remote effect of malaria." The sentence is interesting viewed in the light of the case recorded below:—

Ang-Ria, male, aged 36, has been under observation for the last two years with occasional attacks of malaria. On one of these occasions his blood was examined and a benign tertian infection noted.

On November 2, 1900, he came to the Changpoo Hospital complaining of weakness and fever. His blood was examined and found to contain æstivoautumnal parasites of the malignant tertian form. He was treated with quinine and his fever ceased, but he only stayed a week or so in hospital and left against my wish. He was not at the time markedly anæmic. On December 20, 1900, he returned, looking wretched and anæmic. His own statement was that his fever had not returned, and that he had remained better for fourteen days after leaving the hospital, but at the close of this time had rapidly become worse, and unable for work owing to weariness and weakness. He was admitted to hospital and his blood examined. There were no malaria parasites visible in the peripheral blood. The blood count was as follows: red corpuscles 1,200,000, hæmoglobin 15 per cent., white corpuscles 1-10. The latter were almost exclusively large and small lymphocytes, and the stained slides were typical of the disease known as lymphatic leucocythæmia. The spleen was not palpable. The man was thin and the lymphatic glands could be easily palpated in exposed situations, but were not markedly enlarged. They were firmer than usual, freely movable and not tender. There was no tenderness or

enlargement about the bones. The temperature was persistently raised, never reaching normal the whole time he stayed in hospital. His pulse was slightly quickened but poor in tension. No other organic disease could be discovered, and nothing abnormal was found in heart or lungs. The urine was pale, sp. gr. 1012, no albumen nor sugar. Slight ædema was present in both legs. The stools contained a few round worm ova but no ankylostomiasis. He was very constipated.

Treatment consisted of keeping the bowels open, and administering nourishing food with iron, arsenic and quinine. In spite of this he rapidly became worse and died of exhaustion on December 31. No post mortem of course was obtainable.



Acute lymphatic leukæmia is a rare disease and one which is as yet hardly understood. In this case it supervened directly upon a malarial attack, its duration was between four and five weeks and its progress was steady. No rigors were noted and bleeding was not a marked feature. One attack of hæmorrhage from the nose occurred and was only moderate in amount. At the same time fear of hæmorrhage made me refuse to remove an offending molar which the patient was extremely anxious to get rid of The proportion of white corpuscles to red was in this case

greater than in the majority of cases of lymphatic leukæmia, 1-30 being a more frequent proportion. One marked feature about the case was the persistent depression which affected the patient. Generally a cheery individual, he became irritable and possessed with the idea he was going to die, and this he never shook off. At the same time his mind was quite clear up to the time of his death. As to the exact connection, if any, between this disease and the preceding malarial attack, I am in the dark, but it emphasises the necessity for a careful examination of the blood in cases of anæmia. Without such examination a case like the foregoing might easily have been mistaken for malarial cachexia.

# NOTE ON THE TREATMENT OF DYSENTERY.

By M. D. Eder, B.Sc.Lond., M.R.C.S., L.R.C.P. Palmira, Colombia.

As every country is allowed its distinctive dysentery, I limit myself to the treatment of the disease as it occurs here; clinically it seems to be the same as in other parts of the globe. Firstly, as to food. An examination question once put me was: "Why is milk called a perfect food?" The question, one of my few remaining physiological assets, to my thinking supplies the reason why milk so often disagrees with dysenteric cases—especially the subacute forms. (Milk is often objectionable in other inflammatory bowel complaints, e.g., in sprue, as pointed out by Mr. Cantlie.) If it be entirely a question of the harmfulness of the fæcal residue, it may be that it is one of quality rather than of quantity; possibly the fæcal residue from milk is more irritant to the inflamed bowel than that derived from other food stuffs.

A practical difficulty is that milk is unobtainable till late in the day except in very large towns. Beeftea, soups and broths are useless and harmful. Meat, boiled or roasted and finely chopped, I have found the best form of food. In tardy cases I have found over and over again that on changing a milk diet to a meat one improvement has immediately set in. The principal objection to the meat diet here is that fresh meat in most places can be had only once or twice a week; one has therefore to fall back on the common sun-cured beef. Where a greater variety of food is offered, mutton, goat and fresh fish would lessen one's difficulties. In addition one gives the white of eggs beaten up with sugar and water; rice and corn flour as progress is made. Decoctions of simaruba or cinnamon accompany the diet.

Drugs.—So high an authority as Osler inclines to an expectant treatment. My experience of this has been somewhat large and unfortunate. Many sufferers are content to remain in bed drinking camomile or peppermint teas until a gangrenous dysentery occurs; then urgent summonses for priest and doctor. The former being the only one really needed. I have not yet seen a case of gangrenous dysentery recover.

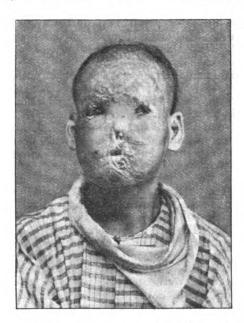
In all acute cases ipecacuanha has given me far better results than the treatment by sulphates, to which I once gave a fair trial. Ipecacuanha is not followed by greater depression than caused by the

salts. The de-emetinised tabloids (B., W. & Co.) were disappointing; causing much the same depression, &c., with less relief than the powder containing all the alkaloids. The general formula for adults is 50 to 60 centigrammes of powdered ipecacuanha with 15 to 20 centigrammes of benzo-naphthol or betol, in an emulsion every two hours throughout the day. The treatment is continued for two or three days, until the stools lose their dysenteric character. For the tenesmus and general pain morphia hypodermically answers best. The most useful drug for the postdysenteric diarrhœa is the strong lactic acid; but it requires to be given in full doses, say 50 centigrammes, with a few drops of paregoric, every two hours. I have no statistics to offer, and few deaths to report when patients present themselves for treatment reasonably early.

### A CASE OF LUPUS IN SINGAPORE. By Lim Boon Keng, M.B., C.M.Edin.

LUPUS A RARE DISEASE IN THE STRAITS SETTLEMENTS.

The portrait is that of a young Chinese, age 20, a house servant, who hailed from the island of Hainan, South China. The case is clearly one of lupus vulgaris, whose destructive character is well shown. The cicatrices and consequent contraction have nearly obliterated the nostrils and have totally destroyed the mobility of the lips. The mouth becomes a small



aperture, which remains open and allows the saliva to trickle away the whole time. The left eye was destroyed some years ago; the right one is just being attacked. The apple-jelly-like crusts may be seen in a group over the right eyebrow.

The chief interest in the case lies in its rarity in this part of the world. During more than seven years' practice, and moving freely among the natives, I have only come across this single case. In a country where tertiary syphilis is common and tubercular leprosy is an everyday eyesore, lupus deserves some attention at the hands of the medical man. There is one form of leprosy—the combined tubercular and maculo-anæsthetic—which, superficially looked at, is not at all unlike the present case. But no medical man can possibly confound the two. In leprosy there is not the same amount of destruction and rapid repair, and besides the crusts, appearance and odour are different.

From tertiary syphilis it is distinguished by the history of the case, but generally, in such an extensive destruction as represented in the photograph, syphilis would have produced enormous gaps by sloughing, and the scars would by no means have been so conserva-The nasal bones would have necrosed long ago, whereas in the present case they remain intact. The fact that phthisis pulmonalis is quite common here is of some importance in connection with the rarity of all forms of superficial tubercular growths. But on this point I hope to be able to furnish you further particulars at another time.

### ON YAWS AS OBSERVED IN FIJI.

A REPORT PRESENTED TO THE STANDING COMMITTEE ON YAWS, POLYCLINIC, LONDON, MARCH 28, 1901.

By Morgan Finucane, M.R.C.S., L.S.A. Assistant Medical Officer, Fiji.

I have commenced my paper by asking "What is Coko or Fijian Yaws? is it a modified form of syphilis?" I am well aware that such a question is not a new one, and that a distinguished authority holds all yaws to be "modified syphilis." The following clinical observations must, however, be taken to represent solely my own views, formed after an intimate acquaintance with Fijian yaws as observed during seven years residence in the Islands of Fiji. During that period I travelled through the greater portion of Viti Levu, living and sleeping amongst the natives in their houses by day and night, and it was part of my duty to investigate and treat yaws cases.

The latest medical literature that I have read on yaws does not to my mind accurately describe "Fijian yaws," which I take to be as modified a form-in another race - of the disease, "Frambœsia," as I submit Fijian yaws is a "modified syphilis" allied to though not identical with what we know in Europe

Therefore it is that, as compared with West Indian or West African yaws, Fijian yaws is somewhat distinct, presenting clinical characters so overwhelmingly in favour of a syphilitic origin as to be beyond dispute or argument, and for all practical purposes, as to treatment, identical.

We may assume that the syphilitic poison introduced into the Fijian race—probably from Tonga—by early voyagers to the South Seas in the latter part of the last and beginning of the present century, and recognised by Captain Cook and others under the various local names in the different groups of islands,

took on first an epidemic character and settled down to the modified form we now see, and which is called by Fijians "Coko." It is possible, however, that the disease may have been present in Fiji for a much longer period than that suggested.

That I have some authority for asserting that this may be the case, will be seen on reference to a distinguished authority, Mr. Berkeley Hill, who in his work on Syphilis, after describing the various forms of unrecognised syphilis says, "that many of the affections in secluded districts spreading among individuals of similar habits, acquired special characters somewhat varying from ordinary syphilis," and it is not unnatural to assume in a new race a new type of the Amongst the diseases mentioned and included by Berkeley Hill is yaws (frambœsia or pian); and a learned report on the "Decrease of the Native Population in Fiji," published in 1896, characterises coko, or Fijian yaws, as the same as sibbens or sivvens, an epidemic disease prevalent in Scotland as late as the present century. It is remarkable that Berkeley Hill claims the disease "sibbens" as a modified form of syphilis.

Coko, or Fijian yaws, is endemic in Fiji, and scarcely any Fijian escapes the disease; in fact, the native belief "that unless a child contracts yaws it will grow up weakly and unfit to withstand other diseases," is put into practice by a diligent attention on the part of the mother, that during the first two years of the Fijian infant's life he shall be inoculated with the The native mother regards coko (or Fijian disease. yaws) as a "crisis," like teething, to be passed through

before her child can attain robust health.

However it arises, it is capable of communication by inoculation through contact between healthy and infected persons, the most common time for it to appear being between six months and two years of age; the probably commonest source of infection being from flies which have fed on yaws, or actual contact

with a yaws sore.

There is a short prodromal stage—of uncertain duration, but believed to be about three weeks or a month—of wasting and fever, with a pinched cachetic appearance; in older subjects, wandering bone pains, especially at night, are complained of. In the more robust or healthy children a few largish isolated sores appear, in some cases only one or two, of a circular character and papular, half-an-inch in circumference. Pushing itself through the skin, if carefully examined, a vesicular bleb will be seen on the top of the sore; but the development of this, when once it appears, is by the rapid piling up of epithelium, so that often its vesicular character is not noticed, and when the sore is first seen it is a fungating granuloma, with hard indurated edge and base, exactly like a mulberry or raspberry. Where the sore encroaches mulberry or raspberry. Where the sore encroaches on mucous membrane it becomes of a condylomatous character, in no way differing from an ordinary syphilitic condyloma.

<sup>&</sup>lt;sup>2</sup> The article on "Coko" being mainly from the pen of our C. Med. Officer, Dr. Corney, a most accurate observer, but somewhat diffident in the expression of opinion.

This Report was originally written some months ago and for another purpose, when the author was in ignorance of the

existence of the Yaws Committee of the Polyclinic.

<sup>1</sup> See Manson's "Tropical Diseases."

Condylomatous patches invade the mouth, lining the fauces and palate and around the anus and anal

margins.

In the more severe cases, each isolated granuloma is the starting point, or "mother yaw," of a crop of vesicular papules, which surround it. There is here circular grouping and in their turn coalescence into a large mass covered with thick yellow scales very like an ecthymatous sore, which, when the scales are removed, can be seen exuding some purulent secretion, in the centre of a slight depression, the remaining ulcer

being punched out.

If the sore is not irritated it dries up in the middle, whilst extending at the periphery, until in severe cases very large areas of skin are involved, and according to its extent and severity much or little contraction of the true skin occurs, producing hideous deformities and contractions. Partial closure of mouth, anus, nose and eyes is not very uncommon, whilst contractions of extremities, cicatricial bands in the vagina, frequently come under notice. A more general type of this stage of the disease, however-in young, badly fed, dirty Fijian infants-is the development in successive crops of, first, minute roseola papules, soon becoming vesicles, and later on, if neglected, coalescing into the larger granulomata spoken of above.

It is rare, however, for these cases to proceed to the full development of what I consider a late secondary manifestation. In most instances, in the badly fed marasmic Fijian children who suffer with the early diffuse vesicular eruption, chronic diarrhœa supervenes, becoming rapidly of a dysenteric character and

ending shortly in death.

This is the usual history of early and severe yaws in young children under 2 years of age; the vital statistics of Fiji showing that the cause of the rapid decrease in the islands is due to loss of life under that age, and from dysentery, the primary cause in most cases being yaws. In isolated granulomatous yaws the prognosis is good if the patients be well cared for, but diffuse vesicular yaws in very young and badly fed infants is exceedingly fatal.

Assuming that the child survives such an acute attack, he lapses into an anæmic weakly state, the vesicles disappearing or coalescing, leaving pigmented scars, contractions and deformities, according to the extent and severity of the cutaneous eruptions, and which pigmentation may take any time from six months to years to disappear. The yaws eruption also appears on the head. Although the hair does not fell out as one sees in syphilis, at the seat of the eruption there is destruction of hair follicles even in Fijians, and in coolies suffering from yaws I have noticed a more general alopecia corresponding with the secondary yaws eruption.

The primary sore of syphilis may be represented in these early yaws cases by the "mother yaw," whether the mother yaw is the primary seat of the inoculation I have no means of judging, as when the patient is seen he is generally covered with the

Eruptive sore-throat such as seen in early secondary syphilis is not noticed and may not exist, but the inside of the mouth and palate are studded with mucous patches of a condylomatous character. General

DS March

chronic adenitis is always present in young Fijians, non-suppurative and shotty, especially of cervical glands, and this quite independently of filariasis, which is of course very common in the group. child survives this stage a period of quiescence supervenes, during which he puts on flesh, becomes strong and sturdy, and to all appearances has shaken off the This period lasts until the child is 8 or 9 disease. years old, when, according to the circumstances of his life or surroundings, there appears what I call the late second stage of the disease, and which may occur from that age onwards to 30 or 35 years.

The clinical features of this stage are the development of circular punched-out ulcers, which may appear anywhere, but are very common about the legs; they have hard indolent edges with weak granulations in the centre; the ulcer spreads at the periphery and if

neglected involves large areas.

The general health becomes again affected, the patient rapidly becoming anæmic with a pallid earthy hue about him, and he easily becomes a prey to intercurrent disease, especially dysentery; periosteal nodes are common at this stage affecting the bones, especially of legs, ribs, forearms, face and forehead. be in no way distinguished from syphilitic nodes.

In severe cases, the whole shaft of a long bone becomes the seat of chronic periostitis, producing deformities so common amongst Fijians as to have received a nickname for such sufferers, e.g., "A tamata sele van," from the deformity of the patient resembling the curved convex edge of a sword or cutlass, and also in outline resembling their native weapon, "the club."

The pathology of this yaws periostitis affecting the whole shaft of long bones, I had many opportunities of observing whilst Medical Superintendent of the Colonial Hospital. On my first acquaintance with these cases I considered them necrosis of the shaft with sequestra, although the extent of the disease and

its chronicity were not quite consistent.

The general symptoms also were not those of acute necrosis, but resembled chronic syphilitic perio-titis, of a diffuse character, dull aching pain, especially at night, chronic congestion of the soft parts of the limb, and in some instances ulceration of them, the patient being otherwise in fair general health and only

occasionally suffering from a temperature.

In several cases I performed osteotomy, suspecting that a sequestrum was present, only to find a thick piling up of the periosteum, with a healthy bony shaft beneath. In fact, these are not cases of necrosis at all, but a chronic periosititis which does not seem to cut off the blood supply to the shaft. Another form of late second yaws appearing at this stage is serpiginous ulceration of the mucous membranes, what the natives call "ka-ni-loma," literally "eating away of the inside." These cases afford most typical clinical instances of the late secondary and tertiary ulcerations

which we see in Europeans from syphilis.

This "ka-ni-loma" if neglected produces shocking ulceration, invading the nose, throat, larynx, and air passages, causing great destruction of tissue and cicatricial contraction and many deaths annually from asphyxia, due to this cause. Less severe cases of the yaws cachexia at this stage are attended by deep

ulcerations on the body and extremities, rhagides of the hands and feet—palmar and plantar psoriasis—or on the soles of the feet. "Soki" is a granuloma pushing its way through the hardened skin and be-

coming sometimes extremely painful.

During the child-bearing period amongst Fijian women, miscarriage and abortion are almost the rule, and although there are many other causes predisposing to both in their life and customs, investigation in hundreds of these—every miscarriage being the subject of a judicial governmental enquiry—has led me to think that secondary yaws affections of the

decidua is the principal one.

The disease of yaws as it affects Indians and Europeans is in no way distinguishable from syphilis, leaving, however, in these races a more lasting debility and cachexia than amongst Fijians, the pigmentation of eruptions also being most severe and persistent. The primary yaws-sore in Coolies appears mostly on the genitals, with a general chronic adenitis especially of the groin and neck. Cutaneous eruptions and ulcers, especially in the cervical neck glands and groins, are, however, not so noticeable in these races living in Fiji as amongst the Fijians themselves, the tendency being to early periostitis of bones and extensive serpiginous ulceration of soft palate, skull, nose, &c.—in fact a more rapid inclination to the tertiary manifestation of syphilis.

The tertiary affections, noticed amongst Fijians by me, have been gummatous masses in the cutaneous and subcutaneous tissue, breaking down into large excavating ulcers, extensive ulcerations of throat and nose and of all bones, especially those of the nose, forehead and cranium. Nerve affections and ascending forms of neuritis of the cord have been also noticed by me amongst Fijians, explicable only on a tertiary implication of nerve centres by the yaws poison, for other causes of nerve breakdown are by virtue of their environment and dulce far niente life and the absence of nerve poisons, such as alcohol, to be excluded in a consideration of such cases. Secondary affections of the eye resembling those of secondary syphilis are not very noticeable, though many of the corneal opacities—so extremely prevalent amongst the race-might well owe their origin to yaws.

It is a most remarkable fact that I have never heard of any medical man in Fiji having seen, nor have I myself ever seen a case of hard chancre in a Fijian. My assumption is that the Fijian is protected by being already syphilised by yaws, for Fijians as a race I should say are very immoral, and have ample opportunities of contracting primary syphilis were

they susceptible.

As it is, true gonorrhea is very fairly common in Fijians at the ports of entry in the colony and to a less extent in the country. One would of course expect to find in newly born and growing Fijian children almost universal evidence of heredit ry syphilis. I have of course seen such cases, but they are the exception. It may be that most of the severely syphilised children are still-born—causing the very large still-born mortality noticed in the Islands.

Typical cases of hereditary syphilis, however, are occasionally seen showing Hutchinson's teeth, Parrot's

nodes, &c., &c. I have often delivered Fijian women of children, who during the first week showed eruptions on nates and general bullous eruptions, such as if seen in a newly born European would have been pronounced syphilitic; nearly all such cases amongst Fijians die within the first week. "Snuffling" in new born Fijian children is almost the rule, which might owe its origin to either syphilis or to other causes. I have never been able to obtain a true history of previous syphilis in an Indian who subsequently became the subject of yaws, nor have I ever seen or heard of an Indian with yaws, nor of one who had ever suffered previously from yaws, contracting syphilis. Syphilis as we see it in Europeans is extremely common amongst Indian Coolies, and altogether I am of opinion that a previous attack of syphilis is protective against yaws, as yaws is protective against syphilis. It is a well known fact also that Fijian plantation labourmen frequently have sexual connection with Indian Coolie women, amongst whom syphilis is fairly common, and yet I have never seen or heard of a primary sore in a Fijian man. Further, this disease of yaws is peculiarly benefited by either mercury or iodide of potassium, noticeably the latter; the most severe cases rapidly yielding to large doses of it.

In the early stages the application of ung. hydrarg. nit. mit. locally to the yaws granuloma or sore, or calomel to the condylomata, with internally mercury combined with iodide of potassium, or the latter alone mitigates the disease, removes the cachexia, and rapidly heals up the local lesions whether mild or

severe.

In fact, the only way to keep the majority of Fijians in good health is to put them on a three months' course of the iodide (gr. x. to gr. xx. t.d.s.) periodically. This is so fully recognised by Government and the Fijians themselves, that annually large quantities are distributed to the natives, and often purchased by them independently at chemists', as the only means of healing long continued local lesions from yaws.

Mercury is not so frequently employed on account of the bad effects attending its indiscriminate use, and the comparative inefficaciousness of it as compared with potass, iodidi, a thing we should expect drawing an analogy between the treatment of early syphilitic lesions—which Fijians are free from—and the late secondary syphilitic manifestations—which Fijians are very prone to.

Tubercular affections are uncommon in Fijians, especially tubercle of the lung, also pulpy disease of synovial membranes is very uncommon.

My conclusions on Fijian yaws are :-

Firstly.—The disease is a chronic and continuous one, and the subsequent phenomena seen in Fijians during adult and old life are sequelæ of the early infantile yaws that the race suffers from.

Secondly.—The early infantile and late adult eruptions are polymorphous and symmetrical, presenting in early life more commonly vesicular, papular, and pustular forms, whilst in later life the tendency is to scaly, isolated, papular ones, psoriasis, rupial and ecthymatous sores, tubercular and lupoid forms of pleasation.

Thirdly.-All Fijian yaws eruptions become of a

raw ham-like appearance, leaving a well marked pigmented discoloration, well seen even in the darkest types of natives.

Fourthly.—No primary yaws sore corresponding to a hard chancre can be found unless the mother yaw

sore can be said to be one.

Fifthly.—There is a general chronic adenitis in all Fijians of a shotty character. This is also noticed in Indian Coolies and Europeans suffering from yaws. It is an adenitis quite distinct from that produced from filariasis, the latter a disease very common on the islands.

Sixthly.—The early bone pains and cachexia are similar to those noticed in early syphilis in Europeans.

Seventhly.—The later secondary yaws troubles such as periosteal nodes, skin eruptions, ulcerations of skin, superficial and deep nodular masses on the skin and deeper parts eventually breaking down into punched-out ulcers, ulceration of soft palate, mouth, tongue and bones, with induration, with many later nervous phenomena pointing to gummatous infiltration are all indistinguishable from the later manifestations of syphilis.

Eighthly.—Eye troubles of cornea, iris and deeper structures are common amongst Fijians, but whether due to yaws poison I am not prepared to say, but

think it extremely probable.

Ninthly.—Early abortion and miscarriage are the rule amongst Fijian women, most often inexplicable after very strict enquiry as to other causes than a

yaws taint of the decidua.

Tenthly.—Typical cases of hereditary (yaws) syphilis are occasionally seen in Fijians, though they are uncommon, and I explain this by saying that severely syphilised (yaws) Fijian women abort or badly syphilised (yaws) born children die early, masking the symptoms of hereditary taint, and healthier children survive without marked symptoms of heredity, only to develop later the second symptoms. The disease of yaws is common in Tonga, Samoa, Rotamab, The Levu Islands, The Solomons, and The New Guinea Groups. In the different races it shows modified characters, no doubt caused by environment, habits, customs and diet, e.g., the Fijian lives principally upon yams, taro, fish and bananas.

There is no doubt but that if, after investigation, a definite pronouncement on the disease were arrived at, immediate measures would be taken to mitigate

or stamp it out.

Crown Colony Governors are peculiarly disinclined to accept theories only as to disease, and in the absence of a definite concensus of opinion, important sanitary reforms are not carried out. It is therefore not difficult to see how often then, perhaps, our profession is responsible for want of legislation in public health matters, owing to an unanimous decision on disease not being arrived at. I have, therefore, had less hesitation in introducing for your renewed consideration the subject of yaws, more especially as now holding an executive appointment in Fiji, I am especially concerned in the administrative affairs of the native Fijians. Some further light may, I trust, be thrown by your Committee on this interesting disease and the means of at least mitigating it.

Besides being of local interest to me and others, the subject of yaws should be, and will tend to be in the future, a matter of serious attention by administrators and public men with regard to the prosperity of our Crown Colonies and the Indian Empire. As you are aware in the West Indies in the past, and particularly in Fiji at present, our prosperity depends upon the output of sugar, the most important industry in that Colony, and which is carried on by the annual importation of East Indian labour to the various sugar estates.

Already serious representations have been made to Fiji, and I doubt not also to the West Indian Colonies who largely thrive by imported Coolies-by the Indian Government as to the occurrence of yaws in returned East Indians and the spread of the disease in British India, and as the Indian Government are most stringent in their regulations as to the individual health of their emigrants during the whole period of their residence and indenture in the islands, they will presently insist on active measures being taken to stamp out the disease in our Crown Colonies, or at any rate prevent the acquiring of the disease by Coolie labourers. If there is reason to believe that the diseases Yaws and Syphilis are analogous, and if that opinion is backed up by scientific medical authority, such as your Committee, the weight of your views would be such that no legislation would be deemed too stringent, or be hailed with more satisfaction by Administrators of Colonies as enabling them to act.

In these days when Malaria Commissions are sent out to investigate this form of tropical disease, and the Colonial Office and our Secretary of State for the Colonies is so actively solicitous for the health of our colonial servants and others, is it too much to ask that similar attention should be given to the investigation of yaws and other diseases. It is only by so doing that our present policy of Imperial Expansion

can be carried on with success.

THE MALARIAL OUTBREAK IN THE PUNJAB LAST AUTUMN (September and October, 1900).—A leading article in the Ind. Med. Gaz., March, 1901, discusses the cause of the high death-rate which prevailed in the Punjab last autumn. During these months in several districts the death-rate rose to over 150 per thousand, and in two the mortality amounted to no less than 200 per thousand. The high mortality followed closely upon an abnormally heavy rainfall. The experience of 1900 was but a repetition of what occurred during 1890 and 1892, and the association of excessive rainfall, with malaria, has served as a basis for some persons to throw doubt on the mosquito-malaria theory. It should be noted, however, that the fever outbreaks invariably occur after the rainfall, when the country is studded with pools and puddies, left by the subsidence of the floods; in these the mosquitoes find ready breeding places; and the fact of these being multiplied indefinitely during the wet seasons helps rather than detracts from the likelihood of malaria being spread by mosquitoes.

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THE

# Journal of Tropical Medicine

APRIL 15, 1901.

### PESTIS AMBULANS, PESTIS MINOR AND GLANDULAR FEVER.

THERE exists considerable confusion concerning the terms pestis ambulans and pestis minor, the tendency being to consider them as synonyms for a single affection. With this acceptation we beg to differ, and to point out that in the use of the terms we may possibly be dealing with diseases belonging to the same genus, but in all probability specifically differentiated. Pestis ambulans ought to be considered as a mild variety of true plague and the term restricted to that condition, just as in typhoid fever mild cases are referred to the same category. Pestis minor, on the other hand, would appear to be a fairly well-defined As so often pointed out by many observers, it is a disease which may precede, run concurrently with, or continue after, an outbreak of true plague, or it may, on the other hand,

occur independently of an epidemic of true plague.

Cases of what must be regarded as pestis minor have been notified by Payne, Goddard, Cantlie, Begg, Simpson and other writers; and the several descriptions of the course of the disease tally so accurately that it would appear that a definite ailment was observed independently by these authorities. The one factor wanting, up to the present moment, that the disease dealt with was caused by a bacillus in any way allied to the bacillus of true plague has been the absence of bacteriological tests. The absence of such proof must not, however, blind us to the possibility of such an alliance. The statement of a case in point may bear this out. A boy, aged 16, dwelling in the heart of one of the largest cities of Western Europe, was taken ill with pains in the limbs, especially the lower extremities, some vomiting, fever, a tender area in right groin, and he became somewhat delirious. He was admitted to a general hospital, and there, after a week, the glands in the groins, iliac fossæ, arm-pits and neck became enlarged to about the dimensions of small beans. The tongue was thickly coated, and the stools became loose, somewhat pea-soupy in appearance and with a considerable quantity of mucus in the motion. The boy's previous history showed he had been operated upon previously for an empyema in the left chest. His mother, a widow, lived in one room with her five children, so that the hygienic environment of the patient previous to admission to hospital may be imagined.

Suspicion of the case, being possibly plague, having arisen, the patient was examined on the fifteenth day after admission to hospital by a medical man familiar with plague, who refused to come to a conclusion on the clinical evidence alone. A small quantity of the blood, &c., from the swelling in the right groin was submitted to an eminent bacteriologist who failed to find the bacillus in stained specimens examined by the microscope. A cultivation gave at the end of twenty-four hours negative results, but after sixty hours the cultivation appeared typical of plague, but a guinea-pig inoculated with the cultivation gave negative results. The cultivated

bacilli were, however, of the involuted form. The boy, after eighteen days in hospital, was removed to an isolation hospital where he speedily improved and got well. This case is of extreme interest. The chief points to be noted are: (1) no case of plague was known to exist in the city, or even in the country in which this boy lived; (2) he had no contact with sailors or with shipping; (3) no other person in the house has had a similar ailment; (4) the only known variety of true plague to which the patient's symptoms could be referred were to those of the septicæmic form of plague; but the boy recovered from what after all was a mild illness, and septicæmic plague is never mild; (5) the microscopic and bacteriological examination and tests seem to indicate not only that the bacilli were few in numbers, but also modified in their anatomical character and not virulent in their toxic power. In our opinion this was a case of true pestis minor with a bacillus allied to that of true plague. many other considerations arise from the careful study of this case: amongst the most notable would seem to be the fact that plague may exist in a sporadic form and remain unrecognised.

The term sporadic, perhaps, hardly conveys the complete isolation of such a case, for plague was not known to exist at the time in any part of Western Europe. What are we to infer from this and other cases which have occurred? The conclusion seems obvious, namely, that in Europe at the present moment sporadic cases of pestis minor are occurring which are unrecognised and excite no suspicion of their true nature. have become familiar with the term "glandular fever" of late years, and it is possible that the illnesses of many children with febrile symptoms and general adenitis are being grouped under this head, which, were they as carefully tested as the boy referred to in this article, would exhibit bacteriological indications justifying their being placed in the plague category as pestis minor.

### PINTA OR LEUCODERMIA?

REMARKS APROPOS OF THE INTERESTING CASE WITH PHOTOGRAPHS GIVEN BY DR. EDGAR IN THE JOURNAL OF FEBRUARY 15, 1901.

By W. J. Buchanan, M.B., Major, I.M.S. Bhagalpur, Bengal.

One is not quite satisfied that the case is one of pinta. Judging from the photographs and the description the case has not been established. In Dr. Edgar's case the patches appear to have only been of one colour, viz., white, with increase of the natural black pigment around the white spots. There is no mention of the presence of any other coloured patches, red and blue, which are characteristic of the disease. There was little or no desquamation, nor were the patches itchy. Moreover, according to Brault (p. 282), the white variety of pinta is always associated with patches of other colours.

Is it absolutely certain that the case was not one of extensive leucodermia, which is very common in India (Allbutt, vol. viii., p. 706)? Dr. Edgar's patient was a native of Madras, where the disease is unknown, but this does, of course, not exclude the possibility of her having acquired the disease while resident in Perak.

Cases of leucodermia, quite as advanced as the photographs of Dr. Edgar's case, are by no means uncommon in India. Good examples of a not dissimilar extension of leucodermia were given in the JOURNAL OF TROPICAL MEDICINE by Dr. F. Pearse, in July, 1900 (p. 294).

The information given as to the presence of mycelial

filaments is not very conclusive.

Before accepting this increased area of distribution for pinta, a new world disease, it is necessary to have a more unequivocal case than this one.

### MEASLES IN THE TROPICS.

By M. D. Eder, B.Sc.Lond., M.R.C.S., L.R.C.P. Palmira, Colombia.

In connection with the reports you have published as to the occurrence of the exanthemata in the tropics, it may be of interest to record an epidemic of measles in this district. The first cases were observed in December, 1900. The disease was probably introduced by soldiers returning from the coast. My cases followed the text-books' descriptions

duced by soldiers returning from the coast. My cases followed the text-books' descriptions.

Palmira is in latitude 3.33° N., longitude 77.59° W.;

954 metres above sea level. Mean temperature 24° C.

Variation in temperature slight.

Mr. Kenneth W. Goadby, M.R.C.S., L.R.C.P., L.D.S., and Mr. James Warburton Brown, M.R.C.S., L.R.C.P., L.D.S., have been appointed Dental Surgeons to the Seamen's Hospital Society. Mr. Goadby is attached for duty to the Royal Albert Dock Branch of the Society's Hospital (to which is attached the London School of Tropical Medicine), and Mr. Warburton Brown will attend at the "Dreadnought" Hospital, Greenwich.

# THE CONDITION OF THE TEETH IN NATIVES OF THE TROPICS.

An editorial in the issue of February 15, 1901, of this Journal, in which Mr. Cantlie asked for information, has brought from Major W. J. Buchanan, I.M.S., a reply in the form of a reprint from the *Indian Medical Gazette* of September, 1899. Although Major Buchanan mainly deals with the question as to whether the stumpy teeth and ulcerated gums so frequently seen in the native prisoners in Indian jails is scorbutic or not, there is much to be learned in the condition of the teeth of the natives in general. Major Buchanan made a careful examination of the teeth of 500 men in good health and on hard labour in the Central Jail, Bhagalpur. The results of these are given in Tables I. and II.

TABLE I.

	Condition found		EALTRY	SICK AND SICKLY	
			r Jaw. cent. men.	Lower Jaw. Per cent. 500 men	Upper and Lower Jaws. Per cent. 50 men
1	Retraction of gums (one or				1
	more teeth)		р. с.	70	75
2	One or more teeth fallen out	7	,,	13	14
3	One or more loose teeth	4	,,	11	8
4	Pus exuded on pressure	2	,,	12	14
5	Irregular rows of teeth	11	,,	21	10
6	Blue-black pigment, slight	40	,,	35	38
7	" " deep	7	,,	21	17
8	Gum thickened but firm, not				100
	spongy	14	,,	24	10
9	Thin bright red line around			8	
	base of teeth	3	,,	8	10
10	Copious deposit of tartar	10	,,	18	16
11	Slight deposit of tartar	20	,,	66	75
12	Gums swollen or spongy	1	,,	8	9
13	Bright red, but firm healthy				
	gums	1	,,	4	
14	Blackened teeth-rows	3	,,	6	6
15	Genuinely clean and healthy				
	gums	55	,,,	14	2
16	Ulcerated gums	N	Vil.	Nil.	Nil.

### TABLE II.

Both upper and lower g	gums hea	lthy	14	p.c.
Both gums equally bad			1	,,
Upper worse than lower			2	,,
Tongue, red and raw pat	tches		5	,,
Tongue pigmented			14	,,
Aphthous spots on gums			3	,,
Gum boils			1	,,
Decaying teeth			5	,,
Buccal membrane pigme	ented		11	,,

"It will be seen from the above table, that even healthy men fit for, and working at, hard labour have very far from sound and healthy teeth. That the state of their teeth would be even worse I believe, but that nearly a year go I ordered the use of tooth-sticks and gave orders for the jailers to encourage their use. The most remarkable fact, however, is the very great contrast between the upper and lower jaws. Nearly every bad condition noted is found much worse and much more commonly in the lower jaws. In only 14 per cent, out of over 500 men examined, could I record that the gums and teeth of both jaws were in

a sound and healthy condition: but 55 per cent. of them had upper gums which were sound, firm and healthy. This, I think, is not difficult to account for, and helps us to an explanation of the condition. Decomposing food or any other local cause acting on the teeth would naturally most affect the lower teeth, on account of the lower lip and floor of mouth acting as a sort of retaining bag for the acrid foreign accretions or secretions. The large percentage of retracted gums in the lower jaw includes all cases, whether one only or many teeth were exposed. In nearly all cases, only the front teeth are affected, and chiefly the lateral incisors and canines. The retraction of the gums in many cases was slight, but in others very advanced. As regards loose or fallen teeth, this may be attributed in some cases to the abuse of mercury by baids, and such class of practitioners, though it is not easy to get a definite history of such from prisoners. Another fertile cause of loose teeth and toothless gums is the long-continued use of lime with the pan. The betel-nut mixture so much used by Indians is, I have no doubt, useful as an aid to the digestion of bulky meals of rice, but we have the authority of Norman Chevers that the use of lime with the pan is bad, because especially where toothcleaning is neglected, the lime forms an incrustation between tooth and gum and ultimately lifts the tooth out of its socket. In the above table there are no cases of ulcerated gums, which I well remember as common in the autumn of 1894. Pus exuded on firm pressure on the gums in only a few cases, and mostly in connection with one or two teeth only. This is the condition Major A. Buchanan has called special attention to under the name pyorrhæa alveolaris. Talbot, of Chicago, has shown in his book on "Degeneracy," that, of over 1,500 criminals examined at the Elmira and Pontiac Reformatories in America, no less than 40 per cent. had irregular lines of teeth, and he looks upon this as one of the stigmata of degeneracy. I believe that the vast majority of the bad gum cases in jail are due to local causes, i.e., neglect of the teeth. In healthy, non-malarious years, if the teeth are neglected, little or no bad effect will be produced upon the general health; but if malarial fevers or diarrhœa or dyspepsia prevail, a very large number of the prisoners who thus suffer will show very unhealthy, swollen and even ulcerated gums. This may be due to want of assimilation of the food, especially when the fever has been of the form common in jails and known as "night fever," which is often neglected by careless prisoners or ignorant medical subordinates. It is possible, moreover, that a casual observer seeing teeth and gums as described above in Table I. in these 500 sleek and healthy prisoners of Bhagalpur Jail, might suspect a scorbutic taint, but this I have endeavoured to show would be a misunderstanding of the cases.'

PLAGUE IN CAPE TOWN.—Up to April 14, 392 cases of plague had occurred in Cape Town since the commencement of the outbreak; of this number 152 cases proved fatal.

### Acbicws.

WEITERES ÜBER MALARIA IMMUNITÄT UND LATENZ-PERIODE. (Further observations concerning the immunity and latent period of malaria.) By Dr. Albert Plehn, Government Medical Officer, Kamerun, West Africa. Gustav Fischer, Jena, 1901, with three plates,

pp. 81.

This work is replete with interest, and is compiled after extensive observations, carried on with that care and scientific precision which characterises all Dr. Albert Plehn's researches. Dr. Plehn does not agree with R. Koch's enunciation that negroes on the African coasts are naturally immune against malaria, but he comes to the conclusion that a relative immunity plays an important part in both natives and Europeans. By a relative immunity, Plehn understands one in which a virulent and persistent exposure to malarial infection is alone capable of producing the disease, and even when infection does take place the course of the fever is practically abortive.

By absolute immunity he understands a condition in which, although the malarial parasite is met with in the blood, the usual symptoms of the disease are in complete abeyance. He, however, considers that although febrile symptoms are not present, that the anæmia of the negro is in all probability due to the malarial infection. In other words, Plehn would seem to regard the so-called immunised state of the negro to correspond to what is termed the postmalarial state in Europeans who have dwelt for a

time in the tropics.

The conclusions Dr. Plehn arrived at as the results of his investigations are: (1) There is a "relative immunity" against malaria in most of the natives of the equatorial West African coastal regions. There is also an "absolute immunity" against the injurious effects of the malarial parasites in many In those who possess this immunity the parasites may be met with years after the last incidental infection without causing any illness. (3) By means of the systematic use of quinine, a relative immunity may in time be achieved in European colonists. (4) The total of those relatively immunised amounts to a half of those observed, and the number of cases of severe illnesses is less than a quarter. In those cases in which quinine has been regularly taken since arrival in the fever centre, these results are still more favourable. Severe, dangerous illnesses and complications, especially hæmoglobinuria, are of extremely rare occurrence when the prophylaxis has been systematically followed. No fatal cases occurred. (5) In persons thus immunised, the malarial parasite —as in the native—is occasionally present without causing fever. (6) With the exception of those who possess natural or artificial immunity, the malarial plasmodia are never present forty-eight hours without causing the characteristic symptoms of fever. (7) In the European colonists, basophile bodies of various sizes and forms are found in the red blood corpuscles before the initial attack of fever. They are likewise present in the natives during the afebrile intervals, and are less frequent during the attack of fever. first appearance proves that infection has taken place,

their presence that it is continued; their disappearance that the infection is extinguished. They stand in near relationship to the latent forms of the malarial parasites; certain types, indeed, correspond to these latent forms. (8) The variation of the number of infected blood cells, and the size of each body has no direct bearing on the severity and frequency of the previous malarial fevers nor on the degree of the accompanying anæmia. The systematic use of quinine exercises a powerful check on the development of the germs and the accompanying anæmia.

This book is of high scientific value, and its careful perusal will amply repay any one interested in tropical

medicine.

### Mew Drugs.

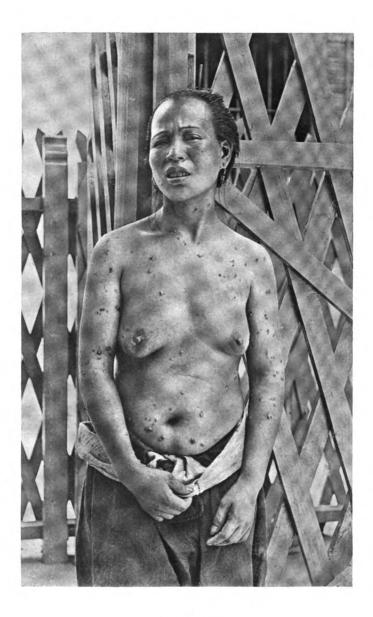
IZAL.—This disinfectant is rapidly gaining in public The scientific tests to which its powers have been subjected seem to have been thorough, and clinical experience fully bears out the results obtained in the laboratory. "Medical Izal," as the refined preparation of Izal is termed, has the advantage-the immensive advantage—of being non-poisonous and non-corrosive. Medical Izal is an emulsion, containing 40 per cent. of pure Izal oil. The preparation is a coal (not coal tar) product, and consists of oxidised hydrocarbons containing a greater proportion of hydrogen to carbon than the recorded members of the phenol series, and a less proportion than the members of the alcohol series. In surgery we can, from practical experience, strongly recommend Izal as a pleasant and efficient disinfectant and antiseptic. It does not injure the surgeon's hands, whilst at the same time it bestows efficient asepticism; wounds are not irritated by its use; and lastly, but by no means amongst the least of its benefits, no damage is done to surgical instruments when they are immersed in it. The literature which the proprietors circulate with their advertisements is of a genuine character, so far as we have seen. Professors Klein and Delépine furnish bacteriological reports of the efficiency of Izal which cannot be gainsaid.

In another part of this issue we have drawn attention to the efficiency of Izal in dysentery; and elsewhere its beneficial action in typhoid has been remarked

upon.

The manufacturers exhibit Izal in many preparations in addition to those we are accustomed to see in the operating theatre. Cuxson, Gerard and Co., of Oldbury, have prepared Izal Lint, Wool and Gauze; Newton, Chambers and Co., Thorncliffe, Sheffield, have prepared Izal Perles, Lozenges, Ointment, Cream and Soan.

It is evident that the proprietors have discovered an efficient germicide, an agreeable disinfectant and an antiseptic of high practical value. To readers of this Journal the fact that Izal possesses a highly beneficial and curative action in dysentery is a matter of consequence. It must be remembered, however, that dysentery being merely a comprehensive term for several possibly distinct diseases, rather than a specific



YAWS.
From a photograph by Dr. P. S. COUSLAND, Swatow, China.

Photograph of a Chinese woman, native of Chao-Chow-Foo. Her husband returned from the Straits Settlements suffering from Yaws; he communicated the disease to his wife and to his son aged 6. This is the only instance of Yaws met with by Dr. Cousland in China. Anti-syphilitic remedies proved inefficacious.

from the first rigor to the time when it begins to clear, being acid, 1016 to 1025, the colour of porter, with a brown froth, and there is deposited slowly on standing a copious brown sediment consisting of blood and granular casts, epithelium, granular debris, and a few red blood corpuscles. In amount it varies enormously, there being polyuria in a considerable number of cases, over 100 ozs being passed in the twenty-four hours in some instances, while in other cases the quantity becomes gradually smaller until suppression sets in and the patient succumbs. There is often a partial suppression on the second day, which is of no serious import. The act of micturition often causes intense pain during the first few hours in bad cases, and the first specimen may contain much pure blood.

The pulse becomes rapid and tense early in the disease, and the respirations shallow and frequent; the pulse-respiration ratio is altered, and instead of four to one may be three or even two to one in severe attacks, and an early distressing symptom is

breathlessness.

The liver is normal in size as a rule.

The spleen, in most of the cases met with here, is enlarged, though whether, in a country where nearly everyone has suffered more or less from malaria, this can be taken into consideration as a symptom of blackwater fever, is open to doubt.

The mental condition is one of anxiety; and constant restlessness and insomnia, with the persistent vomiting, add greatly to the distress of the patient. The mind is usually clear, though late in the disease—in cases which are running an unfavourable course—the patient falls into a condition of low muttering delirium, out of which he appears to partially awake when spoken to.

In cases of suppression of urine, even when very prolonged, we have never seen either coma or convulsions, and in fatal cases death apparently occurs

from exhaustion.

The general condition after the first three days is that of profound anæmia caused by severe hæmorrhage, and recovery is very slow.

The treatment which we have usually adopted has

been as follows :-

A large dose of calomel is given at the commencement of the attack, followed in six or eight hours by a saline, repeated if necessary until free purgation occurs; the patient is then put on a mixture containing sod. salicyl. and sod. bicarb., taken every four hours. Free stimulation is resorted to early, as the strength rapidly fails. Frequent feeding is of the utmost importance, and if food cannot be retained by the stomach, rectal injections and suppositories should be used from the beginning. The vomiting may be combated by chloroform, acid. phosph. dil., sinapisms, and the usual methods, and the insomnia is best treated by bromides, though all attempts at treatment of these symptoms often fail. Digitalis and strychnine should be freely given if cardiac failure threatens; and if the patient recovers, he should be sent at once to a temperate climate.

We are strongly of opinion, after an experience of the treatment of this disease extending over a period of nearly eight years, that no one who has once suffered from blackwater fever should ever be allowed to return to West Africa. Recurrence is the rule; and although an individual may survive many attacks, the disease invariably kills in the end.—Scottish Med. and Surg. Journal, April, 1901.

### DYSENTERY.

THE SPECIFIC TREATMENT OF ACUTE DYSENTERY.—Dr. W. T. Cruikshank believes that in the treatment of dysentery by sulphate of magnesium we have a remedy which stands in as specific a category as the treatment of malaria by quinine. From the first onset of acute dysentery administer the following:—

In a few hours beneficial results may be confidently expected, and in twenty-four to forty-eight hours a marked improvement may be looked for, the stools taking on a biliary appearance. The treatment is continued until the stools are well nigh normal. Three to six days is the average time required for the establishment of convalescence.—New York Med. Journ., March 16, 1901.

IZAL IN THE TREATMENT OF DYSENTERY.—Every practitioner in the tropics will welcome any addition to the list of drugs whereby dysentery may be combated. The most recent of such drugs is Izal, which Mr. W. Watkins-Pitchford, M.B.Lond., F.R.C.S, serving with the No. 7 General Hospital (See Brit. Med. Journ., November 10, 1900), found capable of ameliorating the symptoms of dysentery. Dr. Watkins-Pitchford states that he exhibited izal in the following formula:—

It is asserted that this combination of drugs, in the few sporadic cases of dysentery which have arisen in the hospital, has in every instance "brought almost a rapid cure"; and even in well advanced cases of a severe type the results "have been equally gratifying."

STAINS FOR THE AMŒBÆ COLI.—Loeffler's methylene blue solution is the quickest and best stain for the amæbæ coli; the smears are exposed to the stain for five minutes, then washed in distilled water and mounted in canada balsam. The carbolic fuchsin stain is best when it is desired to stain the nucleus or nucleolus of this amæbæ.—Dr. C. F. Craig in Med. News, March 16, 1901.

### MALARIA.

RECOGNITION OF MALARIAL PARASITES.—According to G. Maurer there are only three forms of the plasmodium; their characters being differentiated as follows: (a) Pernicious fever form. Ring form of parasites are diagnostic of pernicious fever. When in addition crescents are present, and when in a second

examination a few hours subsequently nothing but rings and erescents are found the diagnosis is conclusive. (b) Quartan fever form. The parasites are larger, may or may not show rings, leaving the cell body intact. (c) Tertian fever form. The smaller size of the parasite and the granulation of the cell body characterise this form of the parasite.

Maurer states that when in two specimens of blood taken at intervals of a few hours no parasites are found the presence of malarial infection may be excluded. Stained specimens are more satisfactory than are fresh specimens in the diagnosis of malaria.

—Münchener Medicin, Wochenschrift, February 19 and 26, 1901.

A Modification of the Romanowski-Ruge Method OF STAINING THE PLASMODIUM OF MALARIA AND OTHER By W. Hanna, M.B., R.U.I., D.P.H. Cantab.—The following account of a modification of Romanowski's method will be found in the Russian Archives of Pathology, Clinical Medicine and Bacteriology, vol. x. part 4, where Dr. N. Berestneff describes an exceedingly convenient and rapid method of staining malaria plasmodia. It has been used with great success in this laboratory, and deserves to be widely known in scientific institutions in England. The following is the method of preparation. A 1-percent. aqueous solution of methylene blue (med. puriss. Höchst) containing 0.3 per cent. of carbonate of soda, is heated for three hours on a water bath and filtered. One cubic centimetre of this solution is mixed with 1.5 cubic centimetres of a 1-per-cent. aqueous solution of methylene blue, and to this mixture are added five cubic centimetres of a 1-per-cent. aqueous solution of eosine (extra BA Höchst). Old preparations of semilunar bodies and halteridium Danielewskii ought to be stained in this mixture for from fifteen to twenty hours at laboratory temperature. For young forms it is sufficient to stain for from fifteen to twenty minutes without heat, followed by gentle heating for from fifteen to twenty minutes until steam rises. decolourise the red cells, which are blue after this staining, the preparation is put for from two to five seconds in the following mixture:-Ten cubic centimetres of methylene blue, 1 per cent., 200 cubic centimetres of distilled water, and 0.25 cubic centimetre of acetic acid. The preparations are washed in water and dried with blotting paper, and they are then dipped for from five to twenty seconds in absolute alcohol to dissolve off any residual stain, and finally washed in water. Fresh preparations of blood containing plasmodia fixed with absolute alcohol are stained in this mixture diluted with from two to four volumes of water for five minutes without heat, followed by gentle heating for from five to ten minutes. Blood containing trypanosoma, and slides of the intestinal contents of guinea-pigs having trichomonas fixed with absolute alcohol or sublimate, are stained with this mixture undiluted or diluted with two volumes of water, as for plasmodia. The flagella are stained a violet-red, and it may be seen (in trypanosoma) that they have a nucleus; the same may be said regarding trichomonas. The chromatin of plasmodia and the other protozoa in question is stained by this method a bright red violet, the

protoplasm blue, the leucocytic nuclei and Bizzozero's plates like the chromatin of the protozoa, neutrophile granules are rose, eosinophilous cells are purple, whilst the red corpuscles are of a delicate rose colour. Dr. Berestneff working in Bombay has informed us that he has slightly modified the above for tropical climates. He adds the stains in the following order and well mixed :- Soda methylene blue 1 per cent. diluted with equal parts of water, 0.5 cubic centimetre; methylene blue 1 per cent. diluted with equal parts of water, 1.5 cubic centimetres; and eosine 1 in 2000, 5.0 cubic centimetres. He informs us that the best results are obtained with fresh preparations of halteridium and malaria by at once floating the dish containing the mixture and preparations for from five to ten minutes upon the surface of water raised to 55° C. The above method has been tried here with excellent results. - The Lancet, April 6, 1901.

"Mosquitoes in India," see p. 843, British Medical Journal, April 6, 1901.

THE SUPPRESSION OF MALARIA.—Dr. A. R. Waddell, in the Journal of Balneology and Climatology, January, 1901, contributes an able paper on this subject, in the course of which he remarks: "The hammer and chisel, then, for the rock hollows, the drain pipe covered with porous material up to the level of the impermeable, and smooth sides and uniform currents for the running streams.

"There must be no surface oozings, no places where aquatic weeds can grow, no pools, ponds, backwaters, overflowings or leakages, and only those running streams which maintain a certain velocity, and the sides of which are smooth and straight, can be permitted above ground. All others must be piped-in or covered over, and if the needs of man and his animals necessitate open water surfaces they must be netted round or kept under systematic inspection against larve. Lakes, too, must be properly banked and provision made against overflow; storm waters must be anticipated, as in our townships, and areas, waterlogged by the lowness of their levels, must be kept efficiently pumped clear.

"If, as I said before, these conditions are made permanent in any one district, anopheles, and with

it malaria, will become extinct.'

### MALTA FEVER, INDIA.

In the Ind. Med. Gaz., March, 1901, Lieut. E. O. W. Greig, M.B., I.M.S., describes three cases of Malta fever occurring amongst native soldiers who had been quartered for two years in the Swat Valley. The characteristics of the illness were chiefly (1) profuse sweating; (2) undulation of the temperature; (3) the futility of the administration of quinine; (4) severe pains in joints, which become swollen, red, and tender to the touch; (5) the spleen and liver were not enlarged; (6) the blood gave the reaction to Malta fever; (7) there were no malarial parasites in blood. Owing to the variable clinical phenomena which accompany this ailment diagnosis can only be confirmed by the serum sedimentation test. This test

Treatment.

appears to have been carefully applied by Lieut. Greig, and there seems no doubt that the cases he records are really Malta or undulant fever.

### PLAGUE.

Notes on the Plague in Queensland .- In an interesting article on the plague, published, in The Australasian Medical Gazette (January 25, 1901), Dr. A. Jefferis Turner, of Brisbane, remarks that "No observer can fail to be struck with the variability of the bacillus. One is apt to be misled by the bacilli commonly figured or exhibited, which are, naturally, taken from the most typical examples. In the same specimen all gradations may be observed from the most typically bipolar examples, staining only at the extreme ends and perfectly clear between, to specimens in which bipolarity is imperceptible. To establish the diagnosis distinctively, bipolar specimens must be searched for, and this is sometimes tedious work.'

DENYING THE PRESENCE OF PLAGUE.—One of the most preposterous insinuations we are acquainted with is that accredited to the Governor of the State of California, who, in denying that plague exists in San Francisco, intimated in a recent message to the Legislature "that certain physicians, having cultures of plague bacilli in their possession, have, 'innocently or otherwise '-that is, ignorantly or criminallyinoculated the dead body of a Chinaman with them, and that the finding of the germs in such dead body has resulted in spreading a false alarm calculated to strengthen the hands of Dr. Kinyoun, the Federal Quarantine officer, and to induce the city of San Francisco to appropriate more money for its Board of Health." Can ignorance and prejudice go farther?

### Letters, Communications, &c., have been received from :-

B.—Staff Surg. W. G. K. Barnes, R.N., H.M.S. "Undaunted;" Dr. R. Lee Bolton (Smyrna); Dr. S. Osborne Browne (Gold Coast); Major W. J. Buchanan, I.M.S. (Bhagalpur).

D.—Dr. A. B. Dalgetty (South Sylhet).

K.—Dr. Lim Boon Keng (Singapore).

M.—Col. K. Macleod (Woolston); Major R. R. H. Moore,
M.D., R.A.M.C. (Barrackpore); Dr. Frank C. Madden (Cairo).

### EXCHANGES.

Annali di Medicina Navale. Archiv für Schiffs u. Tropen Hygiene. Archives de Medicine Navale. Archives Russes de Pathologie, de Medec., Clinique et de Bacteriologie. Australasian Medical Gazette. Boletin de Medicina Naval. Boston Medical and Surgical Journal. Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology. British Medical Journal. Brooklyn Medical Journal.

Climate.

Clinical Journal. Clinical Review. Giornale Medico del R. Exercito. Hongkong Telegraph. Il Policlinico. Indian Engineering. Indian Medical Gazette. Indian Medical Record. Janus. Journal of Balneology and Climatology. Journal of Laryngology and Otology. Journal of the American Medical Association. La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal. Medical Brief. Medical Missionary Journal. Medical Record. Merck's Archives. New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyclinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo. The Hospital. The Medical and Surgical Review of Reviews. The Northumberland and Durham Medical Journal.

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- 2.—Manuscripts sent in cannot be returned.
  3.—As our contributors are for the most part resident abroad, roofs will not be submitted to those dwelling outside the United

- Kingdom, unless specially desired and arranged for.

  4.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

  5.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the
- 6.—Correspondents should look for replies under the heading " Answers to Correspondents."

# The Journal of Tropical Medicine.

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In order to meet the constant enquiry for addresses of respectable firms catering for the various requirements so difficult to obtain abroad, we give a list of names and addresses which we trust will be found useful to our numerous correspondents and subscribers.

### Original Communications.

### THE ETIOLOGY OF BERI-BERI.

By H. Noble Joynt, M.A., M.D. Government Medical Officer, Fiji.

I READ with much interest the letter of Dr. A. Van der Scheer in the issue of the JOURNAL OF TROPICAL MEDICINE for November, 1900, suggesting that the cockroach (*Blatta orientalis*), is the means by which beri-beri is propagated.

It was my good fortune some years ago to observe an epidemic of beri-beri in Fiji, of which I propose to give a brief outline. This epidemic is instructive from an etiological point of view, but it does not tend to confirm Dr. Van der Scheer's hypothesis.

In April, 1894, 250 Japanese coolies were imported to a sugar plantation at Labosa, Fiji. Beri-beri had never occurred before in this colony. The Japs were placed on an outlying plantation where Indian coolies were also employed. The dwelling-houses or "lines" were specially built for them on the plan laid down by the Japanese Company who sent them to Fiji. The houses, accommodating forty men each, were built of wood, raised on piles, with wooden floors, and freely open to the air on all sides. The walls, though built of rough unplaned timber, were constructed of a kind of open louvre-work, something like fixed Venetian shutters. The floor was covered with Japanese matting. The Japs were very cleanly in their habits. The latrines, on the pail system, situated at some distance from the dwellings, were emptied daily by an Indian topaz, and kept clean.

One month after arrival the first case of beri-beri occurred, but the epidemic did not become general (three cases only being noted during the first four months of domicile) until the beginning of the hot season in September. By the second week of November 219 out of the 250 had contracted the

disease. In February, 1895, the 181 survivors were sent back to Japan.

As the men were attacked with beri-beri they were removed to the plantation hospital, some four miles distant on the home estate, until that hospital was full, then the remaining cases were treated in their own houses. The plantation hospital consisted of three detached wooden buildings, with accommodation for 120 patients. One building was set apart for the Japs, the remaining two held the sick All three buildings swarm with cockroaches. Some of the attendant nurses were Indians. Latrines, connected by a covered way, are attached to each hospital building. If cockroaches are the carriers of beri-beri, this hospital should have proved an admirable breeding ground; yet not a single Indian contracted the disease. On the other hand, cockroaches must have been comparatively few in the Japanese lines, both on account of the construction of the buildings and the clean state in which they were kept, and yet the inmates were attacked wholesale.

Now in this epidemic of beri-beri we have the following factors: -(1) A country absolutely free from the disease. (2) An importation of Japanese on an isolated plantation, where already some fifty or sixty Indian coolies lived in adjacent buildings. (3) The structure of the houses of the two races was totally different; the Japs lived in open, clean dwellings, practically free from cockroaches; the Indians in closed up, dark, ill-ventilated houses swarming with cockroaches. (4) Many of the Japs had, previous to immigration, suffered from beri-beri, perhaps some had the disease latent in their systems if that were possible. (5) Not till the hot season set in, with its accompanying high temperature (mean minimum, September to November, 68.5 to 73 degrees F., mean maximum, 82 to 89 degrees F.) and moisture from heavy tropical rains, did the epidemic take hold of the Japs. (6) The personal habits of the Japanese, who, when not working in the fields, used to wear the same heavy cotton dressing-gown-like garment day and night, and were accustomed to sleep huddled together, three or four under the same mosquito screen. (7) Japs and Indians associated in the fields, lived in adjacent buildings, were treated in the same hospital, though not under the same roof—they mixed freely together in the open air, but did not occupy at any time the same building, i.e., were not in close personal contact. (8) Out of 250 Japanese 226 contracted beri-beri, whereas not a single Indian or other nationality was infected. (9) On the repatriation of the Japanese, their houses, after disinfection with corrosive sublimate, &c., were altered into the Indian style of dwelling-that is, boarded up, divided into separate compartments, made dark, floors filled in with clay, &c .- and occupied by Indians; they speedily became dirty, for where the Indian coolie is dirt becomes superabundant, and infested with cockroaches. Yet no cases of beri-beri

All the above conditions —heat, moisture, personal habits of crowding together, the slow beginning, the rapid spread of the epidemic as soon as the climatic conditions became suitable-favour, I think, the more generally received theory of infection direct by a slowly infective germ, introduced in this instance either by a man already infected before arrival, or by clothes or other belongings, and propagated by direct contact, or by dwelling in a house saturated with the germs; and negative Dr. Van der Scheer's hypothesis. Had cockroaches been the intermediate hosts the Indians could hardly have escaped, as these insects must have carried infection into the Indian houses both (2) in the plantation lines, and (6) in the Indian hospital; the Indian dwellings and Indian habits, as we have seen, being particularly well adapted to such a mode of infection.

### HOW TO AVOID PRICKLY HEAT.

By Major R. R. H. Moore, M.D., R.A.M.C. Barrackpore, Bengal.

In May, 1899, I began to use cocoanut oil gently rubbed into the skin to allay the irritation of prickly heat. I used it very cautiously at first, but soon

found it both pleasant and inoffensive.

A couple of months afterwards I read Mr. Frederick Pearse's excellent paper on prickly heat in the June, 1899, number of the Journal of Tropical Medicine. I was thereby encouraged to use the oil more extensively and to abandon the use of soap in the bath. Since then I have been able to keep free from prickly heat, though living in the steamy climate of Lower Bengal. I have also obtained a number of converts to this treatment, many of whom speak of it most enthusiastically. I publish this in the hopes that others may be led to follow our example.

There is, however, a strong prejudice against renouncing such a national institution as soap, and a still stronger one against adopting what many are pleased to term the filthy native habit of anointing one's skin with oil. Like other prejudices these are

without reasonable foundation.

It is quite possible to clean oneself in the bath without the assistance of soap, as Mr. Pearse says, "Soap is only required when bathing is neglected." In hot climates this is surely the case, where as a rule baths are taken twice a day.

At first when soap is given up the pleasure and satisfaction of the bath is somewhat diminished, the hand no longer glides smoothly over the body in a creamy lather, it sticks unpleasantly, the contact is distasteful and the epidermis peels off visibly. This discomfort is only temporary, after a time the skin becomes firm and glossy, and the hand glides over it as before, with the difference that the smoothness is now the smoothness of a firm healthy skin, not the meretricious smoothness of an injurious compound the antecedents of which are doubtful.

The oil recommended by Mr. Pearse is a mixture of almond oil and lanoline. I have not tried it. I have found cocoanut oil satisfactory in every way. It is a clean, non-greasy oil which seems specially adapted for the skin, as the natives found out centuries ago. It has the further great advantage of being readily procured in any native bazaar, and

is exceedingly cheap.

It is difficult to get Europeans, in India at least, to believe that cocoanut oil is not a filthy-smelling product, or that it can be rubbed into the skin without giving rise to any unpleasant aroma. Such, however, is the fact as I have proved in many instances.

Fresh cocoanut oil has only a very faint smell, when rubbed into the skin this disappears almost, if not quite, entirely. If kept too long, however, the oil turns rancid, and then it stinks abominably. The smell of the rancid oil may frequently be detected amongst the lower classes of the natives. When such is the case the smell comes from their clothes which are saturated with the oil and not washed. This, however, can no more be used as an argument against its use than it can against eating butter.

The fear of the oil spoiling one's clothes is also groundless. The skin absorbs the oil, it is not like oiling a piece of metal; after two or three minutes' gentle rubbing the oil disappears, and you can rub yourself with a towel without any coming off, unless of course a great excess has been applied, then the towel will remove the excess.

The best time to put it on is, I think, before going out for the evening's exercise; strip, pour a little of the oil into the palm of the hand, and rub it over the body from the neck to the ankles, get your servant to do your back. It is not advisable to use sponge or rag, as they are not easily cleansed and so become offensive. When done rinse your hands in plain water and dry. If necessary they can then be washed with soap.

When you come in to dress for dinner, take a bath, using no soap. This is the time when you will appreciate the benefits of the oil. You find you can dry yourself perfectly; the skin is not, as is usually the case in steamy climates, sodden and clammy, it is, on the contrary, firm and glossy; you can pass your hand over it with a sense of pleasure, you have also a pleasant sense of coolness, and you can proceed

to dress without breaking out into fresh perspiration. There is no reason why the oil should not be used twice a day if necessary; about a tablespoon each time.

I do not think that the application of the oil interferes with the activity of the sweat glands. I am not sensible of any diminution of perspiration; I take exercise as freely as ever, and regard the admonition to limits one's drinks as a counsel of perfection not likely to be followed after hard exercise in Lower Bengal. From this I argue that the excessive activity of the sweat glands is not the direct cause of prickly heat. In this I agree with Mr. Pearse. He, however, is inclined to regard the affection as a seborrhæa. He says, "I look upon prickly heat as an acute seborrhæa." In proof of this he relies chiefly upon the distribution of the eruption.

But what sets up the seborrhæa? Mr. Pearse says, "Soap removes sebaceous matter from the surface of the skin . . . the sebaceous glands are thus unduly stimulated to produce more secretion, while at the same time the excessive perspiration is also irritating them to lubricate the surface." As soap is freely used in cold climates without producing seborrhæa, it is difficult to understand why

it should do so in hot.

Mr. Pearse evidently considers excessive perspiration an important element, for he says, "Anything which excites perspiration 'brings up' the rash and aggravates all the symptoms;" and again, "It seems that the prolonged sweating excites at the same time

the activity of the sebaceous glands."

The latter statement is the important one, and it appears to be open to doubt; it appears to have been invented to suit Mr. Pearse's theory. It is stated in an indefinite way and no proof of its accuracy is given. That either soap or excessive perspiration can produce an acute seborrhæa remains to be proved.

Though I agree with Mr. Pearse as to the proper method of treating prickly heat, I differ as to its causation. I believe it to be an irritation of the skin produced by the constant bath of perspiration in which the body is kept in hot muggy climates. This brings it into line with intertrigo and the so-called "flannel rash," eruptions caused by irritating secretions from the body.

As for its distribution, I hold it to be largely accidental; influenced to a great extent by clothes, their nature, amount, and manner of being worn; and also by the obesity of the individual. The places it selects are those where perspiration tends most to collect

The skin is naturally intolerant of prolonged exposure to moisture, nature's protective greasy coat offers but a feeble resistance, and in steamy climates it rapidly becomes sodden. We increase the evil by removing the greasy coat by the use of soap, and keep up a constant vapour bath by means of flannels. The result might readily be anticipated.

In climates where the diurnal ranges of temperature are considerable, flannel no doubt is useful, but in Lower Bengal in the rains, when the temperature varies but little, and the atmosphere is saturated with moisture so that evaporation is reduced to a minimum, they do more harm than good. The cholera belt is a sure producer of prickly heat under these conditions.

If this be true the rational treatment of prickly heat is (1) to preserve nature's protective coat by abandoning the use of soap, and (2) to reinforce it when necessary by some lubricant. By adopting these simple means many of us in Barrackpore have saved ourselves from the inflictions of prickly heat during the hot seasons.

# A CASE OF BILHARZIA OF THE PERITONEUM.

By Frank Cole Madden, M.B., B.S.Melb., F.R.C.S.Eng.

Professor of Surgery, Egyptian Government School of

Medicine;

Senior Surgeon to Kasr-el-Aini Hospital, Cairo.

Since its discovery by Bilharz in 1851, bilharzia of the bladder and rectum has always attracted the attention of pathologists, especially Cobbold, Griesinger, and Sonsino, who have worked in this country; but it is only during the last fifteen years that the widespread dissemination of the parasite throughout the various organs and tissues of the body of the native Egyptian has been recognised.

It cannot be said, however, that our intimate knowledge of the pathological wanderings of this extraordinary worm has been very much increased, for most of the instances of erratic bilharziosis are found by accident. We know that the worm and its ova are carried by the portal vein and its vesical and intestinal radicles, and that it is possible even for the worm to make its way against the course of the blood stream and so reach parts in which its presence was formerly difficult to explain (Scheube); while some even hold that the worm may go straight to a part without the intervention of the blood stream (Kartulis.)

No doubt, when sufficient material has been collected, the chain of infection will become complete, and we may then be able to cope more satisfactorily with the invader before the worm itself, its ova and its embryos have become disseminated

throughout the organism.

The most generally recognised seats of tumours resulting from bilharzia are the bladder and what we may call its appendages (the ureters and kidneys above and the urethra below), and the intestinal tract, especially in the lower part of the large bowel in the sigmoid flexure and rectum,\* though it now seems not uncommon to find tumours along the length of the descending colon.

Cases have also been reported and are occasionally noticed of bilharzia of the vagina,† and from the observations of Rüffer and Symmers many other organs and tissues are not at all uncommonly

affected.

Scheube<sup>†</sup> quotes many interesting cases and among them one of Sonsino's where the vesiculæ seminalis

Practitioner, May, 1899.
+ Lancet, June 24, 1899.

<sup>†</sup> Scheube, Die Krankheiten der Warmer Länder, p. 413, 1900.

were much swollen and contained many calcifying ova. Mention is made of the extension of ova from such cases in the semen, which would probably explain some of the cases of primary infection of the vagina, in which no evidence of bilharzia in any of the neighbouring organs can be found. The veins of the penis have also been found loaded with small embryos and ova.

He also mentions several cases of carcinoma, sarcoma, and fibro-adenoma containing ova (Kartulis); and I feel certain that some of the cases of extensive epitheliomatous growth around the anus met with in Egypt are not true growths, being partly bilharzic in origin, though it is only rarely that the ova can

be discovered microscopically.

The prostate, the urethra, the ureter, the pelvis of the kidney, with all possible septic and extension complications along the whole urinary tract, are constantly involved, and though the general impression appears to be that *all* stones in Egypt are bilharzic in origin and therefore phosphatic and soft, this is not the case, though many examples of such stones are met with in all the usual situations. Bilharzia ova have also been found in hæmorrhagic infiltrations and with enlarged mesenteric glands.

The present case is that of a young Egyptian male, aged 26 years, who was admitted to Kasr-el-Aini Hospital, under Dr. Sandwith, with a history of fever, probably malaria, and the passage of blood and mucous in the fæces during the last two years. Three months before admission he had pain in the right side of the abdomen with colic, which lasted for three days. There has been some vomiting at times and pain in the abdomen and flatulence after meals. The urine contained no albumen, sugar, or bilharzia ova. The fæces were examined microscopically and contained blood corpuscles and bilharzia ova. Small villous bilharzia masses were felt on the anterior wall of the rectum just below the prostate. On abdominal examination both liver and spleen were enlarged. Extending across the middle line just above the umbilicus was a horseshoe-shaped swelling, which was very hard, dull on percussion, fairly movable and somewhat tender. The swelling varied in size and did not always occupy the same position, moving most readily towards the left side until it was almost under cover of the ribs. provisional diagnosis was a tubercular mass in the omentum and on percussion a rather dilated stomach appeared to come just down to the upper edge of the

As the patient began to lose weight and had severe pain at times, Dr. Sandwith transferred him to me

for exploratory laparotomy.

An incision was made in the middle line above the umbilicus and the omentum presented into the wound. It was very thin and ill-developed, and contained several fleshy masses scattered throughout its substance. On further search a large number of soft swollen mesenteric glands of various sizes were discovered. These became larger and firmer as they were traced down towards the mesenteric attachment.

Just under the abdominal incision a soft nodule, the size of a large almond and attached to the parietal peritoneum, was cut across. As these appearances seemed to indicate a sarcomatous infection of the peritoneum further operation did not appear to be advisable. However, the transverse colon was examined and found to contain a large hard mass within the lumen of the gut. An incision was made into the colon and exposed a fleshy tumour with a smooth undulating surface, firmly incorporated with the wall of the colon at its mesocolic attachment, and extending for some six inches along it. There was no attempt at a pedicle, and imagining that our diagnosis of sarcoma was confirmed, no attempt was made to excise the tumour. The incision in the gut was closed with Lembert's sutures, the peritoneal cavity washed out with normal saline solution, and the abdominal wound sutured with silkworm gut sutures.

Much to our surprise Dr. Symmers reported that the omental and peritoneal nodules contained hundreds of bilharzia ova. None, however, were found in the particular mesentric gland which had been removed for examination. Unfortunately no piece of the mass in the colon was removed, but from the presence of bilharzia in the rectum and in other situations in venous connection with the colon, it is reasonable to infer that it was also a bilharzia tumour.

The subsequent history of the case was interesting. He had no bad symptoms, very soon took all his food by mouth, began to grow fat, and lost all his pain. What is more extraordinary is that the tumour gradually disappeared and could not be discovered on careful examination when the patient left

hospital six weeks later.

This disappearance of bilharzia tumour after operation I have noticed in another case, in which a very large tumour of the bladder completely disappeared after a suprapubic cystotomy, in which the bladder was sutured to the abdominal wall. The ova also disappeared from the urine.\* Such a favourable result is not at all usual with bladder cases; for, in general, all that can be done is to provide perineal drainage, destructive changes in the ureters with cystic kidneys and pyelonephritis, found post mortem, furnishing striking evidence of the futility of further operative interference.

# THE TREATMENT OF CHRONIC GRANULAR LIDS.

By A. B. Dalgetty, C.M., M.D. South Sylhet.

THE usual method of treating this troublesome disease by applying various caustics and disinfectants is certainly a tedious process, and on the whole an unsatisfactory one.

I have found the following radical proceeding to give immediate relief and apparently permanent benefit, and as it does not appear to be generally known I will give a short account of it.

The conjunctive and the neighbourhood of the eye

<sup>§</sup> Lancet, June 24, 1899.

|| Stone Number, Indian Medical Gazette, August, 1900.

¶ Scheube, Die Krankheiten der Warmer Länder, p. 413, 1900.

<sup>\*</sup> Records of Kasr-el-Aini Hospital, 1900.

having been thoroughly disinfected with corrosive sublimate, 1 in 1,000, 10 minims of a 5 per cent. solution of hydrochlorate of cocaine are injected into the loose skin of the lid and the same solution is also freely and firmly rubbed into the everted and thickened conjunctiva. The eyelid is then grasped with a pair of fine-bladed forceps in such a way that the whole breadth of the diseased portion is thoroughly everted and exposed; then with a pair of scissors, curved on the flat, the entire thickness of the hardened membrane is removed right down to the healthy tissue beneath. When the forceps is removed free bleeding ensues, but it is arrested at once by the perfect apposition of the eye-ball. A pad of lint and a bandage is all the dressing required. The lids are drawn apart and the exudation washed away with boracic lotion twice daily until healing takes place, usually in four days.

There is no deformity of the eyelid as a result of this treatment, neither is a general anæsthetic

necessary, nor slitting of the canthus.

# SOME INSTANCES OF UNTREATED SYPHILIS.

By A. B. Duprey, M.R.C.S., L.R.C.P. Grenada, B.W.I.

In a former paper I pointed out that syphilis in the West Indies was a common disease notwithstanding the dictum of authorities to the contrary; that the two diseases yaws and syphilis were dissimilar and bore no relation whatsoever with one another. Syphilis, though appreciably modified as it must necessarily be among the dark races, is nevertheless syphilis, and can be recognised as such if one takes the trouble and interest to effect a diagnosis.

The stages of syphilis may not be as regularly made out as in England, nor the eruptions be necessarily identical with those observed in the European malady, still, however, it is common hereabouts and has been so for a considerable number of years, and the fact of its being mistaken for other diseases can no more be doubted. The vexed question of contagion in yaws, for instance, has, I have no doubt, originated from syphilis having been innoculated instead of the former disease. That this is so one can gather from descriptions of yaws by certain authors, such, for example, as Numa Rat, quoted by Croker, and which seems to me more readily applied to the manifestations of syphilis than those of yaws. The student of tropical medicine would find it extremely difficult to diagnose yaws on that description; on the other hand, should he expect to find the classical stages of syphilis such as represented to him in books, his disappointment, I fear, will be great. Diseases admit of vast modifications under climatic influences, it is true, and what really are the same diseases under different conditions are often described as totally different, and vice versa; yet in tropical syphilis, though there may be some slight variation owing to climatic and racial influences, is still sufficiently well marked not to fail in its recognition. There is a wide field for the investigation of diseases in the tropics that are

really modified versions of those seen in a colder climate, and none more so than skin affections, which particularly offers to the student an interesting and attractive study. Tropical skin affections are not all parasitic, as seems to be the general belief; for, as I am inclined to believe, a considerable share may be put down to the ingestion and the assimilation by the gastro-intestinal tract, which strikes one as being a filter, not only for the transmission of proper nutrition to the body, but which not infrequently suffers the admission of injurious toxins prejudicial to the system.

It is too much to expect to find a roseolous rash on a black skin, and coppery-coloured discolourations are certainly very difficult of discernment. I have seen the roseola only once and that in a native of a fair complexion; the rose spots of typhoid fever are never seen in the tropics, at all events, I have never seen them either in fair or dark complexioned natives, yet typhoid is a frequent visitor in the tropics as evidenced by post-mortem examinations.

In district practice crowds of marasmic children are brought to the medical officer with no other history than that of a gradual dwindling away; their little faces are pinched and the flabby skin as it were directly superposed on the skeleton without the intervention of any subcutaneous fat; they look like little withered old people. To obtain any reliable history from the parents is well nigh impossible, though with females some points might be gained as to the number of miscarriages and children they have had, how many were born dead or how many died during infancy. The labouring classes are convinced that the doctors cannot treat marasmus, and invariably end by taking their children to the quacks, who without any knowledge of the malady prescribe mercury with the most happy results, thereby confirming the people in their opinions. We are too apt to mistake hereditary syphilis either for tuberculosis or innutrition. The people are not alive to the dangers of syphilis and neglect to come forward for regular treatment. Many years ago there used to be in Trinidad a law compelling venereal people to present themselves for treatment once a week, but for some reasons best known to legislators this was allowed to subside, and now syphilitic people roam about at leisure untreated. Legislation, in my opinion, is urgently called for in those places where syphilis is common so as to prevent this broad-cast sowing of a formidable disease.

(1) A woman, aged about 22, had a tubercular syphilide on the face and forehead; she was coloured, and in this instance the diffuse erythematous blotches on her face were distinct. She was in bed with fever, headache and sore throat, she complained of aching pains all over her body. There was no rash anywhere on the body except the face. The initial sore was not located. After a short course of anti-syphilitic treatment she got up but never returned, although she was warned and within easy reach of the dispensary. This indifference to a grave malady is universal in these islands, and it is only when the disease is far advanced that advice in the proper quarter is sought.

(2) A boy, aged about 6, was brought for bad eyes. All kinds of local remedies had been tried, the advice of friends had been rigorously followed, and various washes, each in turn, had been used, when finally the doctor was thought of. He was emaciated, stunted and almost idiotic; he was hard of hearing; his face was long, drawn, and blase; his teeth were small and rotten; his eyes were closed and two streaks of tears rolled down on each withered cheek. He had a pustular eruption on the lobules of each ear which extended to the outer meatus resembling impetigo. On raising the upper lids of both eyes they were found to be watery and acutely inflamed; interstitial keratitis apparent in both eyes. In this case there was a clear history of syphilis in both parents, though this was hardly necessary, the evidences of hereditary syphilis being so palpable as to admit of no doubt whatever. I saw the child but once after the first visit, and the mother thought him so improved that she never appeared again.

(3) A coloured man, a sailor, was admitted on September 9, 1900, in a most pitiable condition. He must have been about 35 years or possibly more. He was, to use a common term, mere skin and bone, and was carried as he could not walk. There were no signs of disease either of his lungs or heart that I could make out. Both legs from the ankle upwards were ulcerated, shallow and serpiginous in character, healing below and spreading upwards, leaving behind a tract of unhealthy, ugly-looking scars. His voice was indistinct, which I attributed to his weak condition. There was no sore throat or other signs of syphilis. He was treated with iron and nux vomica, and both ulcerated legs strapped over a dressing of boracic acid ointment. On October 26 there developed double iritis which rapidly disappeared under syphilitic treatment, from which time he began to improve, and it was not long before he put on flesh and was able to move about unassisted.

(4) Coloured man, a sailor, of a strong and muscular build, recently arrived from Trinidad. He had had gonorrhea a couple of months back, though he denied having a sore. There was a slight urethral discharge but no evidence of a sore could be found. A papular eruption covered his body specially marked over his face and upper part of the trunk. The papules were larger and more indurated than those of yaws and moreover were not capped with yellow points such as is characteristic of that disease. There was sore throat and the fauces were congested. He was treated for syphilis and warned as to the gravity of his condition. I saw him accidentally some weeks after and he informed me he was now well and did not want any more medicine.

(5) A little girl aged 10 years had been ailing for the last eighteen months. The mother said the child was quite well before and attributed her indisposition to supernatural influences—"She is possessed by spirits, sir." She first attracted attention by picking up various "bits of things" from the ground and putting them in her mouth. Her father died from some obscure disease contracted in Trinidad. The mother had four children by the patient's father, three of whom died in infancy; no miscarriages. The patient was a well-nourished, well-shaped child;

her skin was black and smooth; her speech was thick and limited to two words, "ca' me," that is to say, she fancied she was always being called; she was also partially deaf. This child was not brought for treatment but had strayed into the house where I was seeing some patients, repeating the words "ca" me! ca' me!" I begged she should be submitted for examination. Over both lungs, front and back, could be heard ronchi and moist rales; the heart was normal; she coughed slightly. Her conjunctive were congested and of a dirty colour and somewhat of a yellowish tinge; her nose was well formed; her tongue was thick and impressed me as being too large for her mouth, the throat was not affected; the teeth were notched, pegged, and stunted, representing in fact a remarkable example of Hutchinson's syphilitic teeth, and which were, beside her condition of partial deaf-mutism, the only conclusive evidence of hereditary syphilis. About ten days after her admission to the district hospital, all the physical signs of bronchitis had disappeared and her eyes had cleared up. The mother came for her after a course of six weeks' treatment, and she was discharged contrary to advice. She could then articulate more distinctly and would ask for cake. Her habits which were originally dirty improved, and "she was not so mad." The evidence of syphilitic affection of the brain shown in this case is one not often met with in the young. Goodhart mentions syphilitic idiocy which is said to be rare and progressing to dementia. As yet this child could not have been described as an idiot, for even after a short course of treatment she showed marked intelligence, being able to recite a part of the alphabet and count up to twenty, which she remembered from previous tuition, but hers was a condition that will gradually but surely culminate into one of complete dementia in the absence of proper treatment.

(6) Portuguese, aged 25 years, and a native of the West Indies, was practically bed-ridden; he was extremely anæmic and emaciated, and presented rupial sores irregularly distributed on different parts of his body. They were the most typical syphilides I ever saw in the West Indies; the crusts were thick, dirty, and laminated, shrunken in some, showing the bevelled edges of the ulcers beneath, and each surrounded by an erythematous areola. There were scarring of the legs, arms, and forehead. The tibiæ were very tender on pressure and presented a few small swellings (gummata) with rounded apices soft and doughy to the feel as if ready to break down. There was no evidence of a primary sore either on the genitals or elsewhere, and the case was clearly hereditary. The mother had five children who died in infancy and one miscarriage. He had a 24-ounce mixture containing 15 grains of potassium iodide to the ounce, and ten days later walked into my consulting room looking, if not the picture of health, yet greatly improved from his former condition. This case had received hospital treatment for, it is said, a considerable time, and the only inference that can be drawn from his severe condition is that his case was not diagnosed.

Thus it will be seen that "tropical" syphilis. though to a certain extent modified from the syphilis of the colder climate, yet does not admit of such vast modifications as to be unrecognisable or be mistaken for another disease. My own belief is that the secondary manifestations of acquired syphilis is very much in abeyance and often so slight that patients do not recognise the gravity of their condition until the disease has made considerable progress. The primary and tertiary stages are severe, the primary sore often going on to phagedena, which I believe to be a condition peculiar to the tropics and essentially pathognomonic of syphilis.

My thanks are due to the Colonial Surgeon, Dr. Orgias, for permission to publish the above.

### CEREBRO-SPINAL FEVER ON COOLIE VESSELS.

By Dr. W. K. MILEY.

Surgeon-Superintendent of the ship "Elbe."
(Published by permission of H.M. Secretary of State for the Colonies.)

THE outbreak here reported took place on board a coolie immigrant ship bound from Calcutta to Georgetown, British Guiana. She started from Calcutta on October 18, 1900, and reached her destination on January 5, 1901.

Total number of cases, 17.

Total number of deaths from this disease, 14. First case noticed on October 18, 1900 (day of embarkation).

Last case first noticed on November 9, 1900.

Details of Outbreak.

 First case noticed evening of day of embarkation, i.e., nine to ten hours after he left depot.

(2) Patient was not under treatment on board previous to occurrence of this attack.

(3) No suspicious cases had occurred previously on board.

- (4) I was told in Calcutta by Mr. Mitchell and others that cases of cerebro-spinal fever had occurred in Depot previous to embarkation. The Chief Compounder told me that coolie No. 392, Jhagni, who had been assisting in the Depot hospital, told him that on the evening before embarkation a coolie who was to have come in this ship was attacked in Depot with fever, delirium, &c., and died within a few
- hours.

  (5) As first case occurred on day of embarkation there was not time for cases of fever to occur on board previously; but during first three weeks (the period during which all cases but one—which occurred in beginning of the fourth week—of the cerebro-spinal fever occurred) was very much larger than I had observed on previous voyage (sic). During these first three weeks there was little else on sick list save cerebro-spinal fever and fever.

The numbers were:

(a) Cerebro-spinal ca	lst ases			od we	3rd week
(b) Fever cases nee	ding special	Y		55	
(c) Fever cases, she needing little chiefly entered tion lest seve	ort duration, e treatment, d for observa-				
should ensue	•••	14	•••	9	 38

In succeeding weeks the numbers were:-

	4th week. 5th week. 6th wee	k.
(a) Cerebro-spinal cases	1	
(b) Fever needing attention	19 — —	
(c) Fever, slight cases	15 — —	

I have classified as cerebro-spinal fever only such cases as showed severe head and spinal or severe head symptoms; but almost all the fever cases, in some of which general symptoms were slight, were marked by headache which in many cases was described as severe. The complaint of this symptom was much greater than I have met with in fever cases of previous voyages. Many coolies (many more than I have noticed on previous voyages) complained of headache without other symptoms. The fever, too, in many seemed to cause more prostration and to leave the patients more enfeebled than is usual in my experience. In the fourth week of the voyage there was but one case of cerebro-spinal fever (he is now, January 5, making good progress to complete convalescence) and the ordinary fevers were not so severe nor were the headaches.

The type of these fever cases was mostly intermittent, but many, especially the severer cases and in early stages of the disease, partook much of the remittent type. Amongst such a number of cases, especially in ignorant coolies it was not practicable with my staff to nicely differentiate even if actual division existed, which I doubt.

### METEOROLOGY.

Weather should have suited coolie on ship excellently, fine in Calcutta for some time previous to and at embarkation, and very fine for first three weeks of voyage (save for some five or six days when we had some heavy rain squalls). It has been one of the finest voyages I have had; people were much on deck and even in heavy rain the ventilation of 'tween decks was better than I have had before, for I have used here for the first time specially designed diffusers which enabled me to leave the air shafts wide open without tents (tents interfere somewhat with ventilation) even during the heaviest rain. There was much sunshine and these diffusers being made partly of glass allowed the sunshine to penetrate into 'tween decks.

The winds were:—First week, light north-westerly to north, then westerly to southerly; second week, south-easterly, east, calm and variable; third week, light to fresh westerly, and south-westerly to south-easterly trades.

During the first four weeks no storms or thunder; on one or two nights some heat lightning. Temperature in 'tween decks varied from 88 to 90 degrees (occasionally 91 to 93 degrees), but was not unduly oppressive, for though weather was warm (about 84 degrees at noon in chart room on deck) the fine nights enabled me to keep the hatches, &c., open.

### EVIDENCE OF CONTAGION.

(1) I think there can be no doubt as to the disease having been imported by the coolies. The first case was noticed within a few hours of embarkation, and the disease existed in Depot previous to embarkation. No evidence of contagion from case to case. The patients came from here and there through the ship.

(2) Of those in attendance on the patients none were attacked by cerebro-spinal fever. One hospital sirdar suffered from severe fever but the symptoms did not justify a diagnosis of cerebro-spinal. The hospital topaz who had to remove the dejecta (most of which were passed in bed), the nurses who attended the female patients, and the other two sirdars who kept watch in the hospital where these cases were, sometimes four to six at a time, were unaffected. No two cases occurred in any one family, though of two of the fatal cases one was a man with a wife and child, one a woman with a child who remained with the mother throughout. I was obliged from want of room to treat this case in female sick bay 'tween decks where there were many other women and children about; yet I had not the slightest reason to think that any of these women or children were affected.

Some chest and dysenteric patients treated in same hospital as the cerebro-spinal cases showed no evi-

dence of contagion.

There had been fatal cases of this disease on this ship during her voyage with coolies to Fiji in the earlier period of this year.

### SANITARY DEFECTS.

None that I know of so far as the ship is concerned. 'Tween decks were clean and dry, ventilation and accommodation good. She measured for 590, but carried this time only  $587\frac{1}{2}$  statute adults. The disease dying out in early part of voyage would point to conditions on board being inimical to it. Water was good.

### EFFECT OF MEDICAL TREATMENT.

I don't think medicine effected very much. Out of seventeen cases only three now (December 22) survive, and these are probably the usual proportion which survive in any such outbreak. I have no statistics by me. The first eight cases, all fatal, were treated chiefly by blistering and cold lotion to head, calomel and saline aperient and iodide and bromide mixture. Later I tried quinine (grs. 20 to 25 daily). Three of these still (December 22) survive, but cases not numerous enough to justify belief that their survival is due to quinine. In two cases treatment was chiefly expectant-nourish as much as possible, relieving headache-and both these proved fatal. Morphia hypodermically seemed to relieve headache and restlessness in one case (still surviving and making good progress to complete recovery) in which these symptoms were very marked. Combination of antimony and opium seemed in a couple to relieve headache; but I feared to press it much in a debilitating disease where I had no skilled attendants to be by the patients. Owing to large number of sick, &c., it was impossible for me or my compounder to give very much time to individual

### REMARKS.

I think the disease was brought on board by the coolies. Its prevalence in Depot, its development on board within a few hours after embarkation, and its ceasing after first twenty-four days (last case occurred on November 9) are against the ship being a factor in its causation or continuance. Whether

it arose in Depot or was brought there from up country by the coolies I have no means of knowing. There seems to me a connection between these cerebro-spinal cases and the exceptionally large number of fever cases in which prostration and headache are marked features. It seemed as though the coolies had been exposed to some epidemic influence tending to cause fever, and that this fever in its severer form was the fatal cerebro-spinal variety, while in its less severe form it showed as the remittent intermittent kind. Possibly such influence prevailed in the districts whence the coolies came, and that the change to sea air and healthier conditions on board ship soon wore it out.

Prevalence of famine in India during the past year may have had something to say to it. The coolies on the whole were not as robust a lot as I have often had. Most of those attacked by cerebro-spinal fever, however, were not from amongst the weedier looking

lot on board.

None of the officers or crew or compounders were attacked, nor was I myself.

### EXTRACTS FROM CASE-BOOK.

Case 1. Ramberich.—October 18.—This evening complained of fever for which he was put into hospital and given Dover's food. There was nothing special noticed at the time. At 6 a.m. next morning he was lying on his back apparently unconscious; at times twisting about; no moans or cries; temperature 102 degrees, pulse about 120, respiration rapid. Gave calomel grs. 3, following by saline; cold lotion to head: quining tonic next.

lotion to head; quinine tonic next.

October 19.—Bowels have acted; is sensible; took some chicken broth; much headache for which I gave 20 grs. of bromide. 3.15, cold and clammy in collapse; is sensible and swallowed some brandy; I injected some also hypodermically; put hot bottles around him but suffusion set in on the lungs causing loud loose rales; at 5.25 he died. Just before death he got very restless, wanted to sit up; said had much headache. There was no eruption and no swellings. At first I regarded death as due to collapse in fever, but occurrence of other cases linking this one to those in which symptoms of cerebro-spinal fever were more evident, and knowledge that cerebro-spinal fever had prevailed in the Depot, made me regard it as a case of this disease.

Case 2. Mohabir.—October 20.—Found him about 7 p.m. last night in 'tween decks heavy and lethargic; eyes heavy but not injected; lies on back moving arms about aimlessly or rolls from side to side; slight moaning; semi-conscious when touched or loudly spoken to; lungs clear; heart and pulse fair; won't take drink. Moved to hospital and blistered head. Temperature 98 5 degrees. To-day is much same. Temperature 99 to 99 3 degrees. Gave calomel and saline purge.

October 21.—More conscious; takes milk and medicine freely. Gave quinine tonic next. Temperature 99·5 degrees. About noon temperature rose to 101·5 and later 102·5 degrees, and with this lethargy returned; he took no notice when spoken to and there was much difficulty in getting him to

swallow anything.



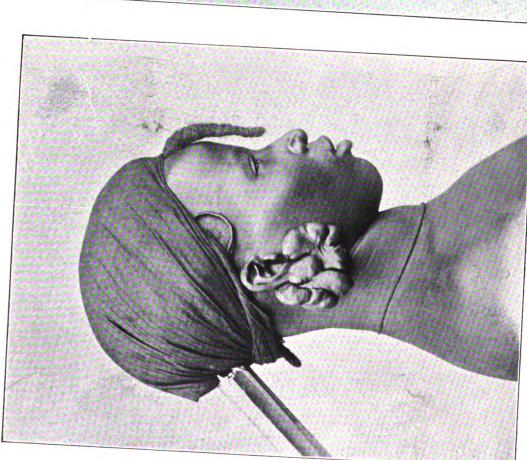






Fig. 2.—Keloidal fibroma of left ear.

# KELOIDAL FIBROMATA.

We are indebted to M. le Dr. BONNAFY (Ministère de la Marine), Paris, for having kindly supplied the original blocks for these illustrations.

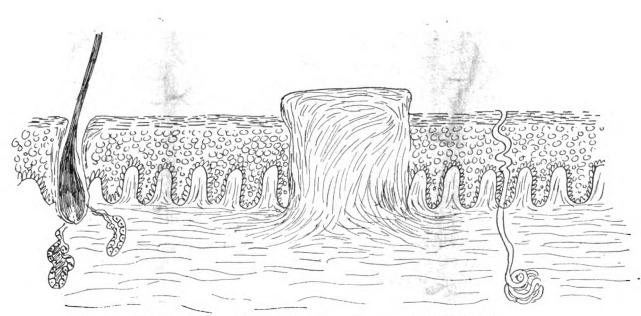


Fig. 3.—Diagram exhibiting the development of ordinary cicatricial keloid.

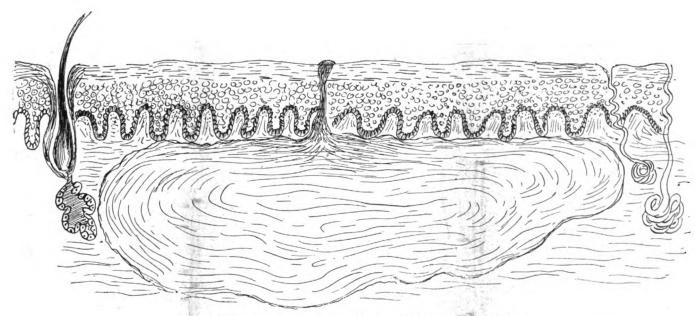


Fig. 4.—Diagram showing the development of the keloidal fibromata.

### KELOIDAL FIBROMATA.

We are indebted to M. le Dr. BONNAFY (Ministère de la Marine), Paris, for having kindly supplied the original blocks for these illustrations.

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October 22.—In early morning temperature was 104·5 degrees; there was much suffusion on lungs causing loud gurgling rales. Died at 6.37 a.m.

Case 3. Pariyag.—October 22.—Fever; heavy and drowsy; forehead and lower limbs. Moved to hospital and gave saline purge. Then at 1.30 p.m. gave quinine and antipyrine aci. grs. 5, and at 3 p.m. quinine grs. 5. Diet small. Temperature, 6 a.m., 103 · 5 degrees, 7 p.m., 98 degrees. At 5 p.m. bowels had been moved; he was sweating, and headache almost gone.

October 23.—Skin cool, is quiet and conscious. Suspecting it to be another case of cerebro-spinal fever I put him on iodide and bromide mixture, and

had head blistered.

October 24.—Restless and wandering and moaning; answers questions fairly clearly; skin almost normal.

October 25.—Skin cool; throws arms about and

moans; tried to pass urine but failed. I drew it off. Takes nourishment well. Continue mixture.

October 26.—Lies on side, ribs drawn up, fairly sensible when questioned but chatters a lot of non-sense to himself. Temperature at 6 a.m. 101.4 degrees; costive. Continued mixture and gave

calomel and saline purge.

October 27.—Early morning is moribund; lungs suffused, large loose rales. I injected brandy without apparent result. Died at 7.45 a.m. Till this morning he seemed to be doing fairly well; seemed less prostrated than the other cases; took nourishment fairly well, and had survived longer than any other case which had occurred up till then. The change for the worse occurred during the night.

Case 4. Gurdin.—October 22.—10.30 a.m., dull

Case 4. Gurdin.—October 22.—10.30 a.m., dull and heavy. Scarcely speaks but nods head when asked if has headache; heart fair, lungs clear. To hospital, head blistered; calomel and saline purge,

then iodide and bromide mixture.

October 23.—Skin cool; restless, moaning and crying out; fæces in bed; at times takes milk and

medicine, at others won't.

October 24.—Skin hot to-day; later in day suffusion of lungs set in, and at 5.45 p.m. he died. Note: One of my thermometers was broken. This and the pressure of work on me and my chief compounder combined with the difficulty of taking temperatures when patients so restless, prevented me taking accurate observation of temperature.

Case 5. Jamni.—October 22.—Fever and headache for which I gave antipyrine grs. 5, quinine

grs. 5.

October 23.—Heavy and stupid; eyes dull; skin cool; moans and cries at intervals. Put in hospital and gave iodide and bromide mixture and blistered scalp.

October 24.—Much same; costive. Continued mix-

ture and gave calomel and saline purgative.

October 25.—Somewhat sensible; to-night quiet and apparently asleep; pulse quiet and small respiration, quick skin about 99. Still costive; repeated purgative.

October 26.—Skin cool; pulse quick and fairly good; lies on back, sensitive to touch, but takes no notice of questions; quiet through night, and passed fæces in bed; takes medicine and drink, still cool;

some loose rhonchus. Continue mixture, sago, milk, &c.

October 27.—Died at 1.10 a.m.

Case 6. Gopal.—October 23.—6 a.m., dull, heavy, and weak; had passed fixes in his dhoti; pain in abdomen and over body. Moved to hospital and given ol ricin; head blistered and put on iodide and bromide next. 7 p.m., moaning at times, at others somnolent; twists about from side to side and on to back. Sometimes takes medicine and milk, at other times won't.

October 24.—Skin cool; more unconscious than yesterday. 7 p.m., died.

Death was not preceded by such suffusion of lungs as that which was observed in other cases.

Case 7. Ramnarain.—October 24.—5 p.m., heavy and dull; temperature 101.5 degrees. Gave calomel

and saline purge.

October 25.—Case in cold sweat; heart and pulse feeble; takes no notice. Gave brandy and put on iodide and bromide mixture. 7 p.m., temperature 101.8; more sensible and takes milk; seems to hear when loudly spoken to; lies on back groaning and moaning and moving arms about aimlessly. One free stool.

October 26.—6 a.m., skin cool; pulse weak and quick but distinct; respiration quick; seems to understand, but does not answer when spoken to. 7 p.m., much moaning; surface apparently very tender for he winces when touched; pulse middling. 9.20 p.m., died. Died more quietly than the others. No loud rhoncus preceded death.

CASE 8. Rajkali.—October 25.—7.30 p.m., dull and listless, says much pain in head. Put in hospital

and given calomel and saline purge.

October 26.—Skin somewhat hot; answers sensible; says no pain; at times talks nonsense; rolls about at times. Iodide and bromide mixture.

October 27.—6 a.m., been noisy last night, now quiet; says "acchha" but is very lethargic; skin about 100; pulse quick but fairly strong. 8 a.m., respiration quick. 7 p.m., skin cool; wandering; throws arms about aimlessly; at times carphology; continued mixture.

October 28.—6 a.m., got worse in night and is now moribund. 7 a.m., died.

Case 9. Ramadhin.—October 28.—7 p.m., fever; Doversi grs. 10.

October 29.—6 a.m., cool; much headache; costive. Mag. sulph., later quinine grs. 5 and bromide grs. 15. 4 p.m., severe headache and pain in body; costive. Gave purgative then quinine and bromide. 4 p.m., severe pain head and body; much prostration; sent to hospital and gave quinine and bromide.

November 8.—Chief symptom in this case has been seemingly intense pain in head and over body and limbs. He has not lost consciousness and has been always able to answer sensibly, but for long spells he cries out and groans owing, he says, to pain in head and body. Temperature has run about 100 to 101 degrees, now and then 102 degrees. No convulsions and very slight stiffness of neck. I tried quinine and antipyrine (as an analgesic), sod. salisyl., &c., without much result. Hypoderm. of morphia relieved temporarily and allowed rest at night.

Antimony and opium mixture also seemed to relieve the pain once or twice when I tried it, but I feared to press this mixture owing to the depression. He

takes food fairly well.

November 12.—He still holds out. Symptoms much as before. Pain is I think less for he gets good spells of sleep and is quiet for long spells, especially if he thinks I am not near. He is inclined to groan, &c., more when he knows me to be near. He has presented much more of the irritation symptoms than have the cases previously observed in which dull lethargy sometimes alternating with temporary restlessness and soon passing into coma or collapse was the chief symptom.

November 19.—Is I think better; temperature has run from 99.5 to 104 degrees; but in intervals between exacerbations he seems quieter; still much pain head and body and limbs. Treatment has been quinine, at times tinct. opii to allay restlessness and pain, and lint. sapor. to surface, diet sago milk broth.

November 27.—Better on the whole during past week; temperature lower and longer spells of ease from pain. Treatment has been chiefly quinine and

wine trional as hypnotic.

December 16.—Much better since 27th. Temperature only once above 99 degrees; has been almost free from pain; sleeps and eats well, and has been sitting out in the open air daily for some days past. The attack has left him very weak and little more than skin and bone. Treatment has been quinine once a day, aromat. mixture with nuc. vom. wine. Diet what he likes.

December 26 .- Has been making good progress, but on 22nd I had to send him to sick bay in 'tween decks to make room in hospital for some acute cases. Since he has been complaining of headache and pains

in limbs, and has had slight fever at times.

January 5.—Arrived in Georgetown, British Guiana. He has been making good progress during past ten days, and is now looking clearer and brighter and is putting on some flesh, though still thin and weak.

CASE 10. Bunsi.—October 29.—6 a.m., complained of fever and headache; very weak and prostrate; unable to walk or sit without assistance. Sent to hospital. Would not swallow saline so I gave a bolus of calomel and jalap, and later antipyrine grs. 3 with quinine grs. 4. 4 p.m., very restless, rolling and tossing about, raising himself on arms and then flopping down again; rolls head about as if in pain; won't swallow and pays no attention to anything said. Bowels cleared; I gave quinine grs. 10 by rectum.

October 30.-6 a.m., skin not at all so hot; pulse fair; lies on back quiet; says "acchha" and no pain; wanders in talk. Quinine grs. 10 per rectum. Noon, seems stronger and more sensible; won't take food; eyes look clearer (they had been dull and heavy). Quinine grs. 10 per rectum. 4 p.m., quinine grs. 10 per rectum. 7 p.m., I gave trional grs. 10 hoping to induce sleep.

October 31.-6 a.m., chattering and shouting all night; drank half-pint milk; temperature about 101 degrees; now quiet on back; answers questions but is heavy and drowsy and feeble. Quinine grs. 10 per rectum bis. 7 p.m., unconscious save to touch.

November 1.—Died at 5.5 a.m.

Case 11. Jhinka.—October 29.—At 3 a.m. she was safely delivered of a living male child. At 8 a.m. she was in high fever. There was nothing noticeable in lochia, womb or pelvis to account for the fever. This made its appearance so quickly after parturition (I don't know if she had raised temperature at time of parturition), and the infant being small and feeble (it died next day) made me believe that labour came on somewhat prematurely owing to the advent of the fever. Much headache. I gave antipyrine grs. 3, quinine grs. 4, bis and bromide grs. 30 at night.

October 30.—Temperature and headache left. M. mag. sulp., then quinine grs. bis Dover at night.

October 31.-6 a.m., cooler; pains less; some prostration; costive; milk in breasts. Pil. col. c. hyox, quinine grs. 5; milk to be drawn off. 4 p.m., still costive; Apenta water. 7 p.m., no stool; glycerine

November 1.-Much same save seems less prostrate; skin about 102.2 degrees; hard dark stools in which a round worm after the glycerine enema; herpes on lip (this is the first case in which I have noticed this). Gave santorius and calomel powders and later Apenta-water, and later glycerine enema (the others had not acted).

November 2.—6 a.m., bowels moved; headache less; looks somewhat better; takes a little milk and

broth. Quinine grs. 10 bis.

November 3.—6 a.m., temperature about 102 degrees; says better; two stools in which three round worms; pulse weak. Quinine grs. 10 bis.; brandy

November 4.—Passed more round worms.

November 5.— Temperature about 102 degrees; diarrhœa; weak. Gave chlorodyne and brandy.

November 6.—Finding she was passing some mucus I put her on m. bismuth. There is paresis of tongue and some dysphagia; also neck stiff and head somewhat back drawn.

November 8.—6 a.m., Temperature about 102 degrees; very prostrate. As she could not swallow I had tried some broth enemata, but they came away as soon as injected. I tried to-day with bismuth, morph., brandy enema without effect.

November 9.—Died at 11.25 a.m.

CASE 12. Dukhiawa.—This was another case of cerebro-spinal fever. First noticed on October 29, when he complained of being sea-sick. I put him in hospital and under treatment. He showed symptoms of nerve irritation more, and those of stupor less, than some of the others. As the acute stage subsided a bed-sore formed over sacrum. (It has been hard work to keep these patients clean, nearly all of them in the acute stages passed urine and fæces in the bed; and as many topazes were ill with fever or sea-sickness the sanitary work was not easy. I managed fairly well by using water proof sheeting in draw blankets and having the soiled ones boiled and washed.) Paralysis and catarrh of bladder also occurred. Treatment: chiefly quinine 10 grs. twice daily per rectum during the acute stages when he could not swallow it, later 5 grs. bis daily by mouth. The bed-sore got t. benzoin dressing. For the paralysed bladder I drew off urine and washed out bladder which soon recovered its tone.

November 28.—Distinctly better; now sits up to defecate; urine is clearing; no rise temperature for some days and he sleeps well; but he is very weak and emaciated.

December 17.—Much better able to get about and is putting on some flesh and gaining strength. On December 12 I sent him from hospital (to make room for some severe fever cases). He has been taking quinine tonic for some time. I tried ol. morrhuæ and wine but they did not agree. His intellect is quite clear. Diet: in acute stage milk broth, sago and milk; later rice and milk to ordinary diet with milk extra.

December 5.—Arrived Georgetown, British Guiana. Has been making good progress; is bright and cheerful and had put on much flesh; not yet quite strong.

Case 13. Tulsia.—First noticed afternoon of November 1. She showed symptoms of prostration and stupor in marked degree, and did not recover consciousness till 5th, when she answered questions; on that day too she seemed to suffer; she rolled to and fro moaning. I gave aperient at start and then quinine by rectum when she would not swallow; also gave brandy. On November 7 she was sinking. I then gave nutrient enemata (previously she had taken milk by mouth) but she sank, and at 11 a.m. of November 7 she died.

Case 14. Chinkan.—At 7 p.m. on November 1 found him at my night inspection. The people about him said that he had got ill only that evening. Temperature was  $103\cdot 8$  degrees; recovered consciousness next day. Complained of much pain in head; pulse was fairly good. At 6 a.m. on 3rd I found him collapsed with fluttering pulse and cold clammy sweat. I gave brandy, but he died at 7.45 a.m. Treatment was aperient then quinine.

CASE 15. Chunkoo.—First noticed morning of November 3; then had temperature 104 degrees. The symptoms of stupor lasted for a short time only but there was much restlessness and excitement at times. Till November 9 he seemed getting on fairly well. On November 9 bladder was paralysed (necessitating catheterisation), and that evening he got suddenly worse, suffusion of lungs set in, and he died at 7.42 p.m. Treatment: I gave purgative, and then for a short time quinine. Then seeing poor results of treatment in other cases, and as he seemed to get on well I confined treatment to relieving symptoms as headache (for which morph. hypoderm. and antimony and opium acted fairly well-bromide in these cases seemed to have little or no effect), and getting him to take nourishment.

Case 16. Abilakh.—First noticed on November 3. In this case there was much prostration at first, also much restlessness and pain in head. At first I gave quinine, then tried to relieve pain and restlessness by morph., which succeeded fairly well, and gave nourishment. At times brandy was given. On November 8 he began to show signs of failing, and on November 9 at 11.25 he died.

P.S.—With many of these I tried cold lotion to head but it had no apparent effect.

Case 17. Randal.—First noticed on November 9

as having fever, headache and cough. There was little or no stupor in this case, but there was delirium, headache, retraction head, and pain at nape of neck. Treatment: chiefly quinine (about 20 grs. a day at first), sometimes brandy, and at times antipyrine for headache. Diet here as in other such cases was milk, broth.

November 28.—Still holding out, and looks as if he might recover. Has been quiet and can now sit

up to food; very thin and weak.

December 6.—Moved from hospital to 'tween deck sick bay to make room for other patients in hospital. Has been making steady progress. Has been taking

quinine tonic, wine.

December 16.—Getting stronger and putting on flesh; Intellect quite clear. Been getting nux vomica, wine, quinine, ordinary diet, and milk extra. Has some acne spots about groin and hands for which ordered washing and inunction of sulphur and oil.

January 5.—Arrived in Georgetown Harbour. He is much improved.

TROPICAL DYSENTERIES.—According to Dr. Stephen Long, dysentery in the Philippines presents five main types:—(1) The first type is fulminating catarrhal dysentery, a fatal form of dysentery running its course in four to eleven days and probably caused by Shiga's bacillus. (2) The second type is simple acute dysentery starting as a diarrhœa and frequently associated with malarial fever. (3) The third type—the amæbic—is divisible into four groups according to the nature of the active agent: (a) the Ameba coli is the commonest, the most persistent and the most serious of these, it is especially prone to cause liver abscess and to become chronic; (b) the Trichomonas intestinalis; (c) the Cercomonas intestinalis, frequently associated with streptococci; (d) the mixed type in which, besides the amœba, the Bacillus pyocyaneus, the staphylococcus (aureus and albus), and the streptococcus are met with. (4) The fourth type, chronic dysentery. (5) The gangrenous and diphtheritic type, which is almost invariably fatal by perforation or toxæmia.

Dr. Long is of opinion that dysentery is an infectious disease carried by the food or drink. In regard to treatment, the main point is early attention to the disease. Sulphate of magnesia in one large or in several smaller doses during the day is especially commended. Calomel followed by Epsom salts is likewise beneficial. Ipecacuanha properly administered is a potent remedy. Subnitrate of bismuth in 40 to 60 grain doses has many advocates. Opium in the form of Dover's powder is a useful adjunct to bismuth. Enemata are occasionally serviceable, first to wash out the bowel with, and then as a medium of introducing medicaments such as tinct. ferri perchlor., 1 drachm to a pint of water, and peroxide of hydrogen. Milk should never be given unless diluted with rice water, barley water, or lime water.-New York Med. Journ., March 30.

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Editors.

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THE

## Journal of Tropical Medicine

May 1, 1901.

# PRIZE ESSAYS ON SUBJECTS CONNECTED WITH TROPICAL DISEASES.

# For Conditions of Competition see page ii. of Advertisement Sheet.

THE interest at present taken in the amelioration of disease is fully borne out by the liberal way in which our public men support research. In connection with the diseases of warm climates the good done in this direction during recent years has been highly creditable to both the investigator and his supporters, and the need for a closer study of the ailments which afflict the native and render the life of the white man so precarious in the tropics, has come home to every one.

Through the liberality of two well-known public spirited men, Sir James Sivewright, K.C.M.G.,

one of our pioneers in South Africa, and the Hon. E. R. Belilios, C.M.G., of Hong Kong, we are privileged to offer two prizes in connection with this Journal. The donors of the prizes have expressed in general terms the subjects which they wished elucidated, and they have left it to us to declare the special points of most interest from a scientific and practical point of view. Sir James Sivewright has selected malaria, and after consultation with colleagues the question of the duration of the latency of malaria after primary infection, as proved by tertian or quartan periodicity, or demonstration of the parasite in the blood, seems a branch of the subject which it behoves us to specially inquire into. The choice of this subject for investigation allows medical men, both at home and abroad, to devote their energies to clearing up our hitherto indefinite knowledge of the latency of malarial infection, and should afford an opportunity for useful and eminently scientific work. Dr. Albert Plehn of the Cameroons, has published a book recently dealing with the immunity to, and the period of latency of, malaria, which we reviewed in our last issue (April 15). His work, although elaborate and comprehensive, by no means exhausts the subject, and we hope that practitioners who have the opportunity to study this interesting subject will take advantage of Sir James Sivewright's offer, and help to advance our knowledge in this direction.

The Hon. E. R. Belilios selected "plague" as the subject of his prize, and in conference with scientific workers on the subject, we have selected the all-important question of the spread of plague by rat-fleas. It is imperative that this question be cleared up speedily, and it is a point which admits of a definite conclusion. A few carefully conducted experiments by those who have the opportunity of studying this matter, will establish a fact and settle the question for all time. The judges selected will, we are sure, satisfy possible competitors. Than Surgeon-General Roe Hooper, C.S.I., President of the Medical Board, India Office; Colonel Kenneth MacLeod, LL.D., Professor of Clinical and Military Medicine, Army Medical School, Netley, and Dr. Patrick Manson,

C.M.G., F.R.S., Medical Adviser Colonial Office and Crown Agents of Colonies, no more competent judges could be found. All papers sent in become the property of the JOURNAL OF TROPICAL MEDICINE, and will be published in the Journal as the Editors decide. We hope the donors of these prizes will be rewarded by an effective competition, and by real additions to our knowledge.

### Translations.

### KELOIDAL-FIBROMATA OF THE LOBE OF THE EAR IN THE NEGRO RACE.

By Drs. Le Danteg and Boyé. (Translated from the French by P. Falcke.)

THE tendency of the negro race to develop connective tissue is a well-known fact, borne out by the frequent occurrence in negroes of fibromatous affections, such as rhino-scleroma, keloids and fibroids.

Various tribes utilise this peculiarity of the "black organism" in the production of connective tissue by instituting actual cicatricial tatooing. Negroes are frequently encountered in America, Africa and Oceania whose faces are covered with symmetrical, exuberant, linear scars which have been artificially induced by simply incising the skin. When the lobe of the ear is pierced for the reception of an ornament it sometimes becomes the seat of tumour, the nature of which, however, is by no means of a definite character. As these tumours appeared of some interest, we took the opportunity of studying their anatomical characters.

After laying the facts before our readers, we propose to discuss the true nature of these growths. The

following case will serve as a type :-

Woman of about 25 years of age, suffering with symmetrical tumours of the lobe of the ear; these tumours in the Malinké dialect are called "néri." The patient's father was the subject of two similar tumours, but no other member of the family exhibited a like deformity. The affection commenced when the patient was about 5 years old, when, according to the national custom, the lobe of the right ear was pierced in order to insert a gold ring. A few days after the operation a tumour began to develop on the lobe of the ear; the tumour grew gradually, but without causing the least pain.

Three years ago the woman consulted the medical officer of the station of Kissidougou (French Soudan), who removed the tumour; another, however, quickly appeared on the same place, attaining a size considerably larger than the primary tumour. At about the same time this negress had the lobe of her left ear pierced, and a month after a new tumour formed at

the seat of the operation.

At present the condition of the patient is as follows: General condition very good, no sign of leprosy. This woman, on various occasions, has had wounds on different parts of the body, but in none of

these did any tendency to the formation of tumours

Right Ear.—The lobe is replaced by a multi-lobated tumour, flattened like a biscuit and about 10 centimetres in diameter. The tumour is free from all adhesions behind the ear, but is united to the cheek (fig. 1, see plate).

Left Ear.—The tumour is appended to the lobe; it is composed of two small lobes about the size of pigeons' eggs; it is free from all adhesions, back and front; it is of a semi-soft, elastic consistency, and is covered by normal black skin (fig. 2, see plate).

The patient refuses every kind of surgical inter-

ference.

### Examination of the Tumour.

Macroscopic Characteristics.—The tumour is tough and elastic; the surface is covered by seemingly normal black skin. On section it grates somewhat under the knife. The cut surface is greyish, and traversed in all directions by fibrous bands. No juice exudes when the cut surface is scraped.

Thin sections taken from the tumour were, after immersion in paraffin, stained and examined micro-

scopically

The tumour is homogeneous and composed of areolar tissue, in the interstices of which there are fibrils of smaller dimensions, but no sudorific or sebaceous glands, nor hair follicles, are to be seen anywhere. The papillæ of the derma are less prominent than in the normal condition, but nevertheless are quite distinct. The various layers of the epidermis are in their normal order; the deep layer is markedly pigmented.

Under a high power it is noted that, in contradistinction to the normal skin of the negro, there is no trace of pigment in the superficial layers of the

dermis.

To sum up: the tumour is composed of pure connective tissue, which during development has destroyed all the normal constituents of the dermisglands, hair follicles, and melanic pigment; the epidermis only has remained intact. One may conclude that the microscopic examination of the tumour demonstrates that it is a fibroma.

We have microscopically examined several other tumours of the lobe of the ear, kindly sent on to us by P. M. O. Gallay; in these the results obtained

were the same.

What conclusion should one come to? Should these tumours be said to belong to the class of keloids, as their history and behaviour would seem to indicate? Or should they be described as fibroids, in accordance with their histological characters?

Let us successively examine the claims of each.

(1) Keloids.—The study of keloids has led to many discussions, but nearly all authors differentiate two varieties of keloids—the true or spontaneous keloid, and the cicatricial keloid. It is evident that here we have only to consider cicatricial keloids, as the tumours under consideration owed their origin to a wound.

One type of cicatricial keloid is furnished by the following observation of Trélat.¹ It is the case of a

<sup>1</sup> Clinique chirurgicale, p. 234.

negro, aged 21 years, who, as a result of a wound on his chin, observed that the cicatrix hypertrophied, forming a tumour about the size of the forefinger across the lip and chin. Trélat extirpated the cicatrix, but the disfigurement returned; at each point of suture a primary keloid formed, consisting of a small tumour showing white on the black skin.

Hardy' says that the keloid, be it spontaneous or the result of accident, is always exhibited as a limited tumour projecting 1 to 6 mm. above the level of the skin, variable in form and extent, but of rather firm

and elastic consistency.

Finally, according to Cornil' keloids the result of wounds may be looked upon as malignant, exuberant They are characterised by protuberant bands, by rounded or radiating prominences, by their hardness and their smooth surface, covered by a thin, glandless hairless skin, by their colour, white or tinted by the little vessels which run over their surface.

It will be sufficient to glance at the annexed photographs (see plate) to become convinced that the tumours are not due to an exuberance of the scar itself. The skin over the cicatricial keloids is white even in the negro (Trélat's case), but here the entire skin that covers the tumour is black (normal). It is therefore impossible to apply the term keloid to this kind of tumour.

(2) Fibromas. - Cornil remarks: In order that a tumour may be said to be a fibroma, it is not sufficient that it contains connective tissue, it must contain no other tissue, for fibromas are composed exclusively of

connective tissue.

We have noted above that in the sections we made in the tumours of the lobe of the ear, the neo-plasic portion was formed of connective tissue only. As the latter develops, all other elements disappear, even the melanin pigment. These tumours of ours must therefore be histologically classed as belonging to the fibromas, but as their origin is due to the consequences of a wound, we propose to call them keloidal fibromata; that is to say, tumours whose point of departure is from a cicatrix, but which are decidedly actual fibroids.

They are not, as it were, exuberant keloids such as the ordinary cicatricial keloids (fig. 3, see plate) but are suppressed or depressed keloids (fig. 4, see plate).

In conclusion, we must direct the attention of

medical men to the frequent-sometimes even fatalrecurrences of consecutive tumours caused by ear piercing. To avoid these recurrences our advice is: (1) to radically extirpate the tumour; (2) to watch the cicatrix of the wound, in order to keep it down either by electricity or the use of the cautery (fer rouge).

It may even be necessary to combat the fibrogenous constitutional tendency of the negro race by a treat-

ment of arsenic or iodide.

### Correspondence.

To the Editor of the Journal of Tropical Medicine. "GNATS AND MOSQUITOES."

DEAR SIR,—The entire edition of my recently published "Handbook" on the above subject has been sold out, and my publisher has telegraphed to me in India that a reprint to supply an urgent demand is necessary.

Our knowledge of the life history and habits of the malariacarrying species is, however, growing so rapidly, that a mere reprint appears to me out of the question, at any rate, as regards the first or general part of the work.

To prevent disappointment will you kindly then permit me to state, through your columns, that a new issue, brought as far as may be up to date, will be ready in May.

Yours faithfully,

GEO. M. GILES, Lt.-Col. I.M.S.

### Rews and Motes.

INOCULATION IN TYPHOID.—The general opinion concerning inoculation against typhoid fever in South Africa appears to be: (1) that it is just possible protection is afforded for a few months; (2) that as a rule inoculation does not modify the course of typhoid; (3) that the incidence of typhoid is diminished is not proved; (4) that in view of the pain and inconvenience arising from inoculation the practical value is questionable.

INSTITUTE OF TROPICAL HYGIENE AT HAMBURG .-The authorities of the State of Hamburg have opened an institute for the study of tropical diseases, and the Imperial Government has contributed to the funds necessary for the building and endowment of of the Institute. Adjoining the Institute is a hospital of fifty beds devoted to the reception of patients suffering from tropical diseases. The city patients suffering from tropical diseases. of Hamburg is to be congratulated upon the public spirit shown by its municipality, and in the interests of science in general and tropical pathology and therapeutics in particular, we hope and wish that the Institute will play a useful and beneficial part in the fight against malaria, dysentery, beri-beri, and other tropical scourges.

### Current Miterature.

### DYSENTERY.

Dysentery in South Africa.—Dr. Washbourne states that chronic constipation is frequent in South Africa due no doubt to the nature of the food available during a campaign. In some cases the accumulation of fæces gives rise to dysenteric symptoms, tenesmus, blood and mucus, and the ailment can only be distinguished from true dysentery by a careful inquiry into the history. Fortunately the treatment of each condition is the same, viz., purgatives and enemata .- Brit. Med. Journ., April 20, 1901.

Dict. Jaccoud, article on Keloids. <sup>2</sup> "Histologie pathologique," p. 858.

EPIDEMIC JAUNDICE IN SOUTH AFRICA.—According to Dr. Washbourne, a large number of cases of jaundice occurred during January and February, 1901, in the Transvaal and Orange River Colony. The disease is ushered in by nausea, by vomiting, or pain in the neighbourhood of the right epigastrium. The temperature may remain normal or there may be moderate pyrexia; the tongue is covered by a white fur, and the bowels may be regular, loose, or constipated. The patient feels wretched and depressed for three or four days, when jaundice appears with clay-coloured stools. The jaundice speedily becomes intense, but in a few days it fades away and disappears. All the cases notified have recovered. The assumption is that the symptoms are due to an inflammation of the duodenum or caused by some infective agency. As many cases of similar illness have been observed without jaundice being present, it is assumed that the jaundice is only an accidental phenomenon.

A Hybrid of Typhoid Fever and Dysentery.—Dr. Paul Remlinger, Constantinople, states that clinical and pathological evidence go to prove that typhoid and dysentery may co-exist in the same patient. Post mortem the lesions of dysentery and typhoid are easily distinguishable, the former being confined to the small and the latter to the large intestine. The course of the temperature is the main clinical evidence of the presence of typhoid, although other symptoms such as headache, insomnia, &c., seem also to point to a typhoid rather than a simple dysenteric infection.—Revue de Médicine, March.

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#### MALARIA.

Antiperiodics and the Malarial Parasite.—Quinine, according to Lo Monaco and Panichi, appears to act directly on the malarial parasite and in one of two ways: (1) By destroying the parasite whilst in the red blood corpuscle; (2) by allowing the parasite to escape from the corpuscle into the blood plasma when it may be incorporated by phagocytes. The parasite in its first or early stage of development in highly resistent to the action of quinine, in the second stage of development the parasite is more readily destroyed by quinine during the febrile than during the apyretic period. The early administration of quinine appears to check or prevent altogether the third or segmentation stage of parasite life. As many persons recover from malaria without taking quinine, it is probable that in the blood or tissues anti-malarial materials are naturally present.—Il. Policlin., February, 1901.

naturally present.—II. Policlin., February, 1901.

Malaria and Typhoid.—Dr. T. W. Washbourne remarks:—"In one case, of which I have full notes, a well-marked attack of remittent malaria with parasites in the blood recurred during the incubation period of enteric fever."—Brit. Med. Journ.,

April 20, 1901.

Dr. David Melville, in his report of 895 cases of typhoid in Ladysmith, five were of the "malarial" type; "the malarial element asserted itself" as the typhoid fever subsided. One case showed quotidian, another tertian, and a third the quartan type.—
Brit. Med. Journ., April 20, 1901.

ETIOLOGY OF MALARIA.—According to M. Vincente, other agents besides the mosquito are concerned in the propagation of malaria. Certain sporiferous parasites of the oleander are known to carry the infection. Agents of transmission coming from plants, especially those kept in hot houses, are also supposed by M. Vincente to possibly play a part in inoculating the human being with malaria. This suggestion is ingenious, but it requires to be substantiated by experimental proofs.—Archiv. General de Med., March, 1901.

#### LEPROSY.

SHOULD LEPERS MARRY ?—In a letter to the Editor of the Medical Record, April 6, 1901, Dr. A. S. Ashmead states that he does not think it advisable to allow lepers to marry, leprosy being a bacillary disease. At the same time, Dr. Ashmead holds that the heredity of lepers has not been proved, and that the surest and best means of extinguishing leprosy is to isolate and take out of the country as soon as born the progeny of lepers. "The greatest part of the cases of heredity indicated are simply cases of contagion." Dr. Ashmead accuses Great Britain of shipping hundreds of thousands of natives of India "more or less related to lepers" to Mauritius, Guiana, Trinidad, Jamaica, Africa, &c., and remarks that England justifies herself in this step "by an assumed belief in non-contagion" The last sentence of this Anglophobe physician informs us "that American physicians will always be found able to instruct Great Britain in the matter of her vast Indian leper problem." We are always glad to learn from American physicians, but we refuse to bring science and the advancement of knowledge to the low level of national limitation Dr. Ashmead would seem to hanker after.

#### MISCELLANEOUS.

GNATS OR MOSQUITOES.—That Lieut.-Col. G. M. Giles' carefully compiled and cleverly written book, "Gnats or Mosquitoes" has filled a distinct want, is proved by the fact that the first edition is entirely exhausted. We hear from Messrs. John Bale, Sons and Danielsson, the publishers, that a new edition is in course of preparation and will be published about June.

White Ants.—The damage done to property by white ants in Rhodesia, seems to be even greater than in India. It is no uncommon thing, says a writer, for the colonist, on returning from his day's labour, to find the coat he left hanging on a nail of his cottage wall and the books on the table absolutely destroyed by this tiny marauders. Nor is this all. "On awaking next morning, you are astonished to see in the dim light a cone-shaped object rising from the brick floor a short distance from your bed, with two holes on the top like the crater of a miniature volcano. Upon closer examination you discover that the holes have just the size and shape of the inside of your boots, which you incautiously left on the brick the night before. They have given form and proportion to an ant heap, and nothing is left of them except the nails, eyelets, and,

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may be, part of the heels." And as the same dismal story-with variations-has to be told about every other article of apparel and all perishable objects, it must be admitted that there are drawbacks to the lot of a settler in Rhodesia.—Indian Engineering, Februrary 23, 1901.

#### PRESCRIPTIONS.

FRESURIFIIONS.
Infantile Diarrhea:  Lactic Acid m30 to 45.  Syrup Quinces
Bismuth Subnitrate
INTESTINAL TORPOR:  Tinct. Physostigma Tinct. Nux Vomica Tinct. Belladonna Thirty drops in water, morning and evening.
$\begin{array}{cccccccccccccccccccccccccccccccccccc$
SEROUS DIARRHEA OF NURSLINGS:—    Atropine Sulphate gr. $\frac{1}{10}$ Distilled Water m 450.  From one to three drops may be given, but the general condition must be closely watched, and three drops must not be exceeded.
DIARRHEA AND DYSENTERY:—  Bismuth Subnitrate 5iv. Powd. Nutmeg 5ii. Powd. Chalk 5ii. Syrup Ginger 5iii. Shake the bottle. Teaspoonful after each movement of the bowels.
PALATABLE EFFERVESCENT QUININE:  R Quinine sulphatis

Aquæ destil. q.s. . . . . ad. 3v.

M. Sig. Add ten or twenty drops to two ounces of water containing five or six grains of sodium bicarbonate.

Ten drops of the mixture contains about one grain of quinine.—Therapist. INFANTILE DIARRHEA. - M. Grosch being very pleased with the results obtained by the administration of tincture of iodine for infectious gastro-enteritis, M. Cattaneo (Semaine Médicale, Revue Mensuelle des Maladies d'Enfance, March, 1901), has been using the same drug in the following form as a treatment for infantile diarrhœa with equally favourable results :-

Tincture of iodine from 10 to 15 minims. .. Syrup .. .. Distilled water 300m. 2,250m.

M. One drachm every two hours.

Syrupi simplicis ...

#### EXCHANGES.

Annali di Medicina Navale.
Archiv für Schiffs u. Tropen Hygiene.
Archives de Medicine Navale.
Archives Russes de Pathologie, de Medec., Clinique et
Bacteriologie.
Australasian Medical Gazette.
Boletin de Medicina Naval.
Boston Medical and Surgical Journal.
Bristol Medico-Chirurgical Journal.
British and Colonial Druggist.
British Journal of Dermatology.
British Medical Journal.
Brooklyn Medical Journal.
Climate.
Clinical Journal.
Clinical Review.
Giornale Medico del R. Exercito.
Hongkong Telegraph.
Il Policlinico.
Indian Engineering.
Indian Medical Gazette.
Indian Medical Record.
Janus.
Journal of Balneology and Climatology.
Journal of Laryngology and Otology.
Journal of the American Medical Association.
La Grèce Médicale.
Lancet.
Liverpool Medico-Chirurgical Journal.
Medical Brief.
Medical Missionary Journal.
Medical Record.
Merck's Archives.
New York Medical Journal.
New York Post-Graduate.
Pacific Medical Journal.
Polyclinic.
Public Health.
Revista de Medicina Tropical.
Revista Medica de S. Paulo.
The Hospital.
The Medical and Surgical Review of Reviews.
The Northumberland and Durham Medical Journal.

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#### Motices to Correspondents.

1.—All communications will be acknowledged in the JOURNAL under the heading "Letters and Communications Received." Contributors who do not see their names in the list should communicate forthwith with the Editors or Secretary.

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and municate forthwith with the Editors or Secretary.

2.—Manuscripts sent in cannot be returned.

3.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

4.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

5.—Authors desiring reprints of their communications to the Journal of Tropical Medicine should communicate with the Editors

6.—Correspondents should look for replies under the heading "Answers to Correspondents."

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In order to meet the constant enquiry for addresses of respectable firms catering for the various requirements so difficult to obtain abroad, we give a list of names and addresses which we trust will be found useful to our numerous correspondents and subscribers.

## Original Communications.

MALARIAL ABSCESS OF THE SPLEEN. By David J. Galloway, M.D., M.R.C.P.Edin. Singapore.

Consulting Physician to the Government of Johore and Physician to His Highness The Sultan.

Splence abscess of malarial origin is rare, so rare as to be deemed sufficient warrant for placing the following cases on record. The absence of any of the ordinary causes of this condition, usually some general infective process (notably ulcerative endocarditis) could in every case be clearly demonstrated, while per contra, the outstanding history of malaria with splenic tumour, reduces any question of etiology to very narrow limits. The first two cases occurred years before malaria had assumed place as a microscopic entity, the latter two were verified in the usual way.

To those who have watched the state of engorgement of the spleen during the cold stage of a chronic malaria (that organ behaving like an erectile tissue) the question must frequently have arisen as to why that process did not oftener overstep the limits of a congestion, and become a true inflammation. Nor is this question by any means answered by reference to the post-mortem table—rather the contrary.

In the large spleen of chronic malaria it is usual to find large tracts of softening consisting of the *débris* of splenic tissue and blood cells deeply melanosed (tarry foci), the line of delimitation of which from abscess formation must be very narrow indeed.

Besides the clinical interest attachable to the varied routes of evacuation, three points in the mass of symptoms may be selected for fuller consideration. These are: (1) pain in the spleen, (2) the intensity of the rigors, and (3) the nature of the discharge.

Pain in the abdomen is not an uncommon symptom in the cold stage of uncomplicated malaria, passing off as the hot stage asserts itself. It may be general, or localised over the spleen; but when this pain is of

such severity as to be made a prominent complaint, it is, in my opinion, a valuable indication that the extent of local implication is out of proportion to the severity of the general disease, and ought, in addition to general treatment, to be met by energetic local measures.

Pain in the spleen was a prominent symptom in the first three of my cases. If, as has been asserted, the spleen is an insensitive organ, the occurrence of pain can only be explained by assuming it to be due to an accompanying peri-splenitis. Colour is given to this view by the fact that in my second case the adhesions, as demonstrated post mortem, were large and extensive; while in the other cases the amount of peri-inflammation must have been considerable to admit of evacuation of the abscess through either of the routes followed.

Then as to the second point, the intensity of the rigor, the evidence of three cases is unequivocal. To a mind familiarised with, and blunted by, a daily recurrence of the ague rigor, that of splenic abscess must be of extraordinary severity to cause it to assume the prominent place it occupied in the consciousness of those sufferers. Even in the fourth case, the absence of any special mention of this point can only be taken as neutral, not negative, evidence, as imperfection in language, it is to be feared, may have led to imperfection in detail in the record of symptoms.

To raise the third point, viz., the nature of the discharge, to the status of a diagnostic may be, by some, looked upon as a dubious refinement. The amount of discharge in Case 1 was too small in quantity to admit of its bearing any pathognomic significance, but the profuse expectoration in Case 2 was at once recognised as being something totally different from that usually obtained through the respiratory tract, let its source be what it may; and the discharge from Cases 3 and 4 being of so exactly similar a nature, justifies me in placing some weight on its distinctions.

Never in any of my cases, nor at any time in the process of evacuation, was the pus of a consistent creamy nature. It was of a pearly-white colour, occurring in large semi-translucent masses or clots, resembling, if an analogy may be pardoned, nothing so much as asbestos or glass wool in a vehicle of some viscid colourless substance like glycerine. As evacuation progressed the discharge became thinner, resembling serum carrying with it those dense woolly clots. The distingushing points are thus briefly: the want of homogeneity in the discharge, and the pearlywhite almost fibrous appearance of its more solid constituents.

Case 1. Rupture externally, Sinus: Recovery .- A large, powerfully built Chinaman of the Kheh tribe, the headman at the tin mines in the Malay Peninsula, came for advice regarding a discharging sore in his abdominal wall. The history obtainable was of the slightest; that of much shivering and fever, the former of which seemed to have left a much more vivid impression on his memory than the latter. Subsequently a large swelling had formed in his abdomen, and after becoming painful, had burst through the opening shown. The opening was circular, about the size of a sixpence, with red pouting granulations practically filling it up. Serum was being discharged in quantity sufficient to soak a dressing of several thicknesses of lint in a few hours, and the orifice frequently became blocked by thick clots of pus, causing great discomfort. It was situated at the outer border of the left rectus abdominis, and two and a half inches above the level of the umbilicus. A probe passed in a direction roughly parallel to the costal margin was productive of the discharge of some The afterdrops of blood containing splenic cells. treatment was unimportant in detail and ended in closure of the sinus and restoration to health.

Case 2. Spontaneous evacuation through the left Lung: Death.—European, male, aged 48, who, blessed, or in view of the life he had led, cursed, by the possession of a living competency, had been a wanderer during some twenty years, in almost every country in Asia, from Persia to Japan, and had lived hard throughout, came first under observation in 1891, for repeated attacks of malarial fever, which he had suffered from for many years. His history was uneventful, being chiefly that of a malaria of quotidian type. was no history of syphilis, but a very pronounced one of alcoholism. Originally of powerful physique, the combined effects of malaria and his mode of life had reduced him to a fleshless anæmic wreck. The lungs and kidneys were healthy as was also the heart, although, as was to be expected, a "bruit de diable" was audible over every area. The liver was large and hard (indurated liver), and projected two fingers-breadths below the ribs. The spleen was very large, filling the left side of the abdomen down to the iliac crest and extending beyond the middle line laterally. After three weeks of fever he became convalescent and disappeared. In March, 1892, he again came under observation. To a night's exposure to the heavy dew of the tropics, following a prolonged debauch, fever was but a natural consequence. A few days' observation sufficed to show marked points of divergence from his previous attacks; the rigors were more intense and prolonged (still being daily and keeping roughly to their usual hour), the hot stage was shorter

in duration and more rapidly followed by a drenching sweat, and each rigor was accompanied by an intense pain in the left side. On these points of distinction, as well as the fact that he was being most inadequately nursed, it was deemed best to send him to hospital under the care of Dr. J. T. Leask, to whom I am indebted for the liberty to follow the progress of the case as well as for free access to the charts and notes. For nearly two weeks his history was such as has been indicated, then he suddenly began to expectorate quantities of thick flocculent pus, and simultaneously with this lost his rigors and seemed to rally for a day or two. The improvement, was, however, evanescent, the expectoration continued profuse, with moist râles over all the left lung, hectic fever came on, and he died exhausted in ten days.

Post mortem.—The spleen was found to be a mere husk, a fibrous bag, containing a quantity of the same thick, pearly-white flocculent pus as had been expectorated. It was adherent by its upper margin to the diaphragm, which, as well as the left lung, it had perforated. The lung was full of pus, and there were signs of breaking down of the lung tissue itself. The liver was enlarged, dense, and microscopically showed great increase of fibrous tissue. The heart and right lung were minutely examined, but neither in them nor in any of the other organs were any morbid

appearances found. Case 3. Rupture and discharge through the Bowel: Recovery. - The patient was a Spanish half-caste, aged 33, who first came under observation in 1894. He was of small but wiry physique, and with the exception of malaria, had had no illnesses which he could remember. For many years he had filled the post of overseer on a sugar estate in the Phillipines, and had there contracted malaria. After coming to Singapore the attacks became less frequent, though not less severe, and for a period of two years he sought advice at intervals on their account. Each attack lasted from eight to ten days, was exceptionally sharp, and, as in the foregoing case, of Beyond a considerable splenic quotidian type. enlargement, no evidence of other disease was found anywhere.

He was lost sight of for several months, till one night some of his friends called me to see him, stating him to be very ill. I found him comatose and pulseless, and believing him moribund, hesitated to make any very minute examination. A cursory glance, however, showed his abdomen to be practically filled by the enormously enlarged spleen. Though convinced of its futility I agreed to see him in the morning, and when I called was surprised to find him not only alive but decidedly better. friends informed me that he had, during the night, passed several large stools under him. The last one they had kept and I had no difficulty in recognising it to be pus of the peculiar nature of that which I had seen in the previous case. The abdominal tumour had in no great measure subsided. Beyond careful feeding and scrupulous attention to cleanliness there was no interference with the course of nature, and to cut a long story short, he was able to be about again in six weeks. His own account of his illness was that the fever had become more severe, with daily

recurrences of the rigors, which were prolonged and intense. Latterly they had occurred several times in the day, with sharp pain over the spleen, but he remembers only a day or two of this before losing consciousness.

There now remains a firm mass about the size of a clenched fist in the splenic region, extending from the upper border of the tenth rib to the iliac crest vertically and laterally, from one inch external to the border of the erector spinæ behind to the line of the an. sup. iliac spine in front. This mass admits of only a limited movement. His general condition is good, his blood count over four millions, there is no leucocytosis and the malarial plasmodium may be got in specimens taken at appropriate periods, as fever yet recurs, though in a much modified form.

Case 4. Operation: Recovery.—In November last I was called to see a tall, large-boned Arab. Little information could be elicited beyond the fact that he had resided for many years in one of the most malarious districts in Sumatra, and had always suffered from fever. The enlarged abdomen he had been cognisant of for the last two years. He was extremely ill, emaciated to the last degree, with a temperature of 104.6° and cold extremities. His abdomen was entirely filled on the left side by a tense swelling which extended two inches to the right of the umbilicus and reached the iliac spine on that side. Posteriorly, in the left quadratic space, there was an area of fluctuation the size of the palm of the hand.

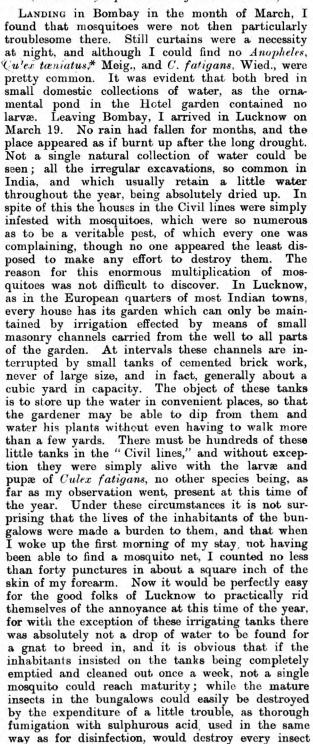
The same afternoon, in consultation with my colleague, Dr. James Kirk, an exploratory puncture in this area was made and pus got at no great depth. It was also decided to use a local, in preference to a general, anæsthetic, in view of the exhausted condition of the patient. Next morning, under ethyl chloride, the abscess was freely opened and drained with a rapid diminution in the size of the abdominal tumour and improvement in the patient's condition. temperature fell to normal and remained so throughout. No information could be got from digital exploration, the finger entering a cavity, and beyond encountering a few stringy cords, it failed to meet a boundary wall in any direction. After draining for three weeks a probe still entered in a direction directly downwards and forwards to a depth of four and a-half inches. For five weeks the tube was retained, being occasionally shortened, and large quantities of the peculiar flocculent pus discharged. Latterly only a thin serum with an occasional flake of pus came away, becoming gradually less until in nine weeks from the time of operation it had quite ceased and the external wound closed. He had in the meantime so much improved in condition as to be scarcely recognisable, and he left for Arabia before I got a final opportunity of examining his abdomen and blood.

#### NOTES ON INDIAN MOSQUITOES.

By LIEUT. COL. G. M. GILES, M.B., F.R.C.S., I.M.S.

Sanitary Commissioner, N.W.P. and Oudh.

(Forwarded for publication by F. V. Theobald.)



<sup>\*</sup> Culex teniatus, Wiedemann, is synonymous with Culex fasciatus of Fabricius. It comes in my new genus Stegomyia.

-F. V. T.



in the house. For this fact I am indebted to Mr. Hankin, the well-known bacteriologist, who discovered the fact in the course of some experiments he was making with the view to utilising sulphur for disinfection of plague-infected dwellings.

The sulphur should be mixed with about oneeighth its weight each of nitre and charcoal, and moulded with gum water into pastilles weighing about 4 ounces; each of which, when burned, will supply sufficient sulphurous acid to render about 1,000 cubic feet of air lethal. It is almost needless to say that before setting fire to the pastilles all doors and windows should be closed, and the rooms treated exactly in the same way as if one were "fumigating" them for some infection. If, however, people would but insist on all domestic stores of water, such as those irrigation tanks, being emptied weekly throughout the cold season, there would be no need to deal with the adult insects, as in the absence of any breeding places the race would soon die out for want of progeny, and only stray stragglers from the distant bazaars could come to trouble the European community. But this would require co-operation, and to secure this is hard, for it is well nigh impossible to convince the even very well educated "man in the street" that there can be any connection between the prevalence of mosquitoes and the cultivation of his cabbages.

The matter, however, is of far-reaching importance as, in spite of the well-known pictures of the anopheles pool, I find that these tanks are, at the proper season, undoubtedly the favourite breeding

places of Anopheles.

On moving into my official quarters in the Macchi Bhawan, which form part of the remains of an old fort destroyed after the mutiny, and are placed on a mound in the midst of an arid plain, I found the rooms to be almost free from mosquitoes, although the well-irrigated Husseinabad gardens are within 400 yards of the site. Still a certain number made their way across the intervening space, so that when sleeping in the open one required a mosquito net. By insisting, however, on the chicks (insect-proof screens made of split bamboo) being let down from dawn to 8 a.m., I kept the house comfortably free.

Shelter during the heat of the day is, in fact, a matter of life and death to a mosquito. About the only way to sleep in comfort at this time of the year in Oudh is to have one's bed placed in the open.

My servant one night was careless in the tucking in of the mosquito net, and when I woke in the morning I found I should have done well to have imitated the Irishman of the story and "crept out under the bottom bar," for the net was alive with happy, satiated dames of the gnat community.

My bed, as a matter of fact, had no bottom bar, but doing my best to imitate the astute Hibernian, I crept out with infinite precaution, tucked in the curtains, and gave directions that the bed should be left where it was. The day turned out somewhat cloudy, the temperature inside the net never exceeding 105 degrees F., but by noon every mosquito was not only dead but bone-dry.

Until the middle of April no other species than C. fatigans appeared, but towards the end of the

month my quarters were suddenly invaded by a swarm of Anopheles Rossii mihi. After some search I found their breeding pool some 300 yards off, beside one of the piers of the old bridge across the Goomti, which flows just beneath the house. The pool was but a few yards long by not more than six feet wide, and though it did contain a certain amount of green filamentous vegetation, was extremely foul. Still it is the nearest approach to the "Anopheles pool" of the West African Malaria Commission that I have met with inhabited by the larvæ. Typical pools of the sort I have indeed come across by the dozen, but in no case have I met with the larvæ in such pools.

The horizontal posture of the larvæ was however very noticeable, and when placed in a tray under lens, I could also verify their peculiar trick of screwing round their heads so as to look upward.

I bred out adult insects from these larvæ and also confined some females over a dish of water from the pool, but I could not induce them to deposit their eggs; and then a plague scare called me away, and when I returned no *Anopheles* could be found in the house, and the pool (which I had kerosined) contained no larvæ.

In May my office moved to the pleasant hill station of Naini Tal, some 7,000 feet above the sea. When I arrived, mosquitoes were very scarce, but we had an abnormal amount of rain for that season of the year, and soon they began to appear in small numbers. The first species I took is one I had last year received from Bakloh in the Punjab Himalayas, and which I then thought might be identical with C. albopictus, Skuse; but about the same time I received a specimen of the latter species from Travancore, and there can be no doubt that they are distinct. The decoration of the thorax closely resembles that of C. taniatus and of C. notoscriptus, Skuse, but the position of the tarsal bands distinguishes it from both, and the venation of the wing does not answer to Skuse's description, so I accordingly describe it as C. pseudotæniatus sp. n. For some time I could not discover the breeding pool of the local mosquito, but ultimately I found that the larvæ inhabit certain pools in the course of the surface drainage system. Even in moderate rain these pools are mere interruptions in the course of a roaring torrent, and it is difficult to understand how any Culex larvæ can maintain itself in such a position; nevertheless there they may be found, even immediately after the heaviest rain.

Taking the larvæ from these pools I bred out two additional new species, C. pulchriventer and C. viridiventer. The former is a very beautiful and well-defined species, but the latter closely resembles C. fatigans, Wied., but is certainly distinct, as it is unlikely that any domestic gnat could maintain itself in such a situation, and it differs radically from C. fatigans in habits of life, for both this and pulchriventer are purely phytophagous, sylvan species; as, though I liberated a number in my sleeping room, none ever attacked me, and they seemed to die for want of vegetable food. Moreover, except by accident, they never enter houses.

In the fresh insect, however, there is no difficulty

in distinguishing the species from each other at a glance by the form of the light abdominal bands which are distinctly triangular in well-marked specimens of C. viridiventex. The most striking point of my observations in the hills is the occurrence of several species hitherto believed to be restricted to Europe. In my "Hand-book of the Gnats" I have already mentioned receiving C. annulatus, Schrank, from Bakloh . . ., but on this occasion I also met with Noe's recently but very inadequately described C. mineticus, and also C. spathipalpis, Rond, besides a species I took to be C. pipiens, L., but which I understand from Mr. Theobald he believes to be distinct. As there is continuous temperate land connection between Europe and the Himalayas, there is nothing astonishing in this, and I look to hearing of the discovery of other European forms in these mountains.

In July, a day or two before returning to the plains, I took in my bungalow a single female of An. Lindesayii mihi, but have since met with no other examples, and I have not been able to discover its breeding pools. Probably like An. Rossii mihi of the plains, it frequents small domestic collections of water, but in Naini Tal at least it is rare.

In July and August, my duties involved an extensive tour through the province during the rainy season. In the early part of the period it was evident that though Anopheles larvæ were common, they had not long been so, as even in places where they were plentiful, I could find no adults. It was not indeed till the end of the month that I began to find them at all commonly in bungalows. The situations, however, in which I found the larvæ entirely upset all the notions I had gathered from recent writings on the subject. I began, of course, by looking for the typical Anopheles pool of Ross, but such as I found never held any of the expected larvæ, and the first place I met with them was in the garden of the Meerut Club, in the small irrigation tanks I have already described. Here they were present in enormous numbers, sometimes alone, but more frequently in company, and apparently on excellent terms with, the larvæ of C. fatigans. It was, however, noticeable that while the Culex larvæ for the most part remained in the middle of the tanks, those of Anopheles generally kept themselves floating with their heads touching its side walls, and so might easily be overlooked. In my subsequent wanderings, I met with Anopheles larvæ in a variety of situations, but always these small irrigation tanks were the "surest find," and further I never met with them at any distance from human habitations, so that I am inclined to suspect that females are unable to mature and deposit their eggs until they have had a feed of blood. I have also met with Anopheles larvæ in muddy pools of some size in brick fields, in the overflow from stand-posts in large cities supplied with a regular filtered water supply, and even in a very shallow depression in the concrete surface of the platform of a bustling railway junction, also fed by a stand-post. The establishment of the part played by the wastage from municipal water supplies in the propagation of malaria is a point of considerable importance, as it goes far to explain

the hitherto inexplicable fact that the introduction of a pure water supply into large towns in the N.W.P. has not, in any instance, been followed by any reduction of the mortality rate. As may be gathered from the foregoing notes, Anopheles appears to be capable of breeding in these latitudes during the greater part of the year, but the drying up of all suitable collections of water, and the fierce heat which renders any remaining collections of water luke-warm, brings the propagation of the species, under normal conditions, to a stand-still during the hot weather; but in shade of the narrow streets of an oriental city, with a constant flow of fresh cool water from the hydrant, the conditions of the rains are reproduced, in spite of the fiery heat; and the potentialities of malaria are prolonged for a good four months, with a corresponding enhancement of the malarial death rate that may more than neutralise the diminished amount of dysentery and other bowel diseases that must, without fail, result from the supply of pure water.

It is useless to seek for any confirmation of this theory in our mortality returns, as these, being unavoidably based entirely on the diagnosis of friends and village policemen, are, though fairly accurate as to total number, quite worthless in differentiating causes of death. One fact, however, they do establish, and that is that in our large towns which have been provided with supplies of pure filtered water, the hot weather, formerly by far the healthiest season of the year, no longer contrasts to the same extent with the autumn in the matter of mortality as heretofore, in cholera-free years; while the difference is as marked as ever in the surrounding country. The remedy obviously lies in good surface drainage, which at present is very defective,

even in our largest cities.

The pools which may always be found in road-side ditches are another very favourite breeding-place for Anopheles. Some of the collections of water in which I have found them have been absurdly small, and would not suffice to fill a wash-hand basin. Far from being, as we have been led to expect, confined to a few marshy pools of moderate size, they are omnipresent, and seem to be capable of developing in water of very varying degrees of purity. Anopheles Rossii is, in fact, what Ficalbi would speak of as a "foveal" and not a "paludal" or even "sub-paludal" species. A consideration of these new facts makes it self-evident that the task of extirpating malaria by the systematic treatment of mosquito breeding-places with larvicides, is by no means as simple as we had hoped it might prove.

As every garden tank and each half-gallon puddle is a possible and probable breeding-place, it is obvious that it would require a small army of conservancy men, and an inquisitorial search of every corner, public and private, to secure the object aimed at. Still it must not be supposed that our knowledge is valueless and that nothing can be done. In cantonments, and in the European quarters of our municipalities (Civil lines) it would be practicable to enforce the weekly emptying of garden tanks and similar domestic water stores, and in such localities the systematic parafining of ditch and

other puddles would not be impracticable. For the individual European, living as he does in widely separated villas, there need be no difficulty in securing a very large degree of protection by a careful search of his compound and its immediate

neighbourhood.

Now as to the question of the natural enemies of the larvæ. There is a general consensus of opinion that as a rule fish are inimical to the larvæ, and personally I have never met with fish and the larvæ of Culicidæ in company; so that it may be assumed that the majority of fish devour and destroy all that appear. This, however, is certainly not the case with all species of fish, for Captain James, I.M.S., finds them constantly in company in the rice swamps of Southern India. It is not to be expected that all species of fish should have the same tastes as to food, and the question is clearly entirely one of species, and it is quite possible that a good deal might be effected by the introduction of undoubtedly larvivorous species into such situations. I do not suggest this species for the purpose, but as an example I may mention that the ordinary golden carp, so common in ornamental tanks in Indian gardens, are so greedy of mosquito larvæ that they never allow them to survive in their company.

Another inveterate enemy is the larva of the dragon-fly, of which we have a great variety of species in India, all apparently equally destructive to

the Culicidæ.

The second second

It is largely due to the well-nigh universal presence of these larvæ in all marshes and fairly sized collections of water in the open, that mosquito larvæ are seldom or never found in such situations. The presence of certain kinds of water plants is also inimical, mainly, I am inclined to think, because they hide the water from the female gnat searching for a suitable place in which to deposit her eggs. At any rate I can in no other way account for the curious fact that, in the Benares public gardens where there are some scores of the small irrigation tanks I have already described, Culex and Anopheles larvæ alone or in company were present in every tank save those that were covered with a peculiar floating water plant looking much like a young lettuce, which is spoken of by the natives as Jalkumi.

In the tanks so planted, the water was alive with young leeches and nematodes, but I could not find

in any of them a single mosquito larva.

Introduced into a tank already containing mosquito larvæ however, the plants appeared to exercise no hostile influence whatever on their development, and for this reason I conclude that the plants act mechanically in the same way as an artificial cover.

During the rains, C. fatigans, Wied., ceases to be the prominent house-gnat that it is in the hot weather; its place being taken by C. taniatus, Meig., C. albopictus,† Skuse, and two others hitherto undescribed, species which I have named C. gubernatoris and C. micropterus; but it was not till late in August that I found Anopheles at all common in bungalovs.

C. fatigans, Wied., is, I may in conclusion

+ This is Stegomyia scutellaris, Walker.

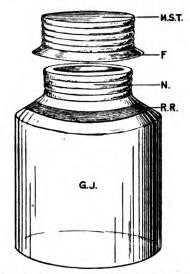
remark a most puzzling species, and I am more and more at a loss to conclude as to what should be regarded as the type.

It would require very large series, coupled with careful examination of larvæ, to come to any definite conclusion in the matter; but I suspect that however close their superficial resemblance, there are really several perfectly distinct species of this type. As to one of these, which I have described as  $C.\ viridiventer$ , I have no practical doubt, as it contrasts in habits of food, and in the habitat of its larvæ, in every respect with  $C.\ fatigans$ , and is a purely Himalayan species. I suspect, too, that a form breeding in large cemented garden tanks in the plains during the rains is also distinct, but I have not yet been able to go sufficiently into the question.

#### A SIMPLE METHOD OF PRESERVING RUBBER ARTICLES IN THE TROPICS.

By W. E. DE KORTE, M.B.Lond., &c. Graaff Reinet, Cape Colony.

I was much interested in Mr. Cantlie's lecture on "Surgery in the Tropics," reported in your issue of December last, and could fully appreciate his appropriate remarks on the many difficulties, one may almost say embarrassments, that beset a surgeon, or rather general specialist, for such a practitioner is in the tropics. "The period of perfection



N. is the neck of glass jar, G.J. R.R., a flat rubber ring. M.S.T., a metal screw-top having a flange, F.

of all rubber and caoutchouc instruments in tropical countries is," as Mr. Cantlie says, "short." After trying a good many dodges to prevent the deterioration of rubber out here, I have found that the following method, if carried out as prescribed, will materially prolong the life of rubber. All that is necessary is an ordinary glass jar with a well-fitting metal screw-top having a flange to it; a flat, perfectly sound rubber band, usually sold with the bottle. Such jars are easily obtainable, being much used for

preserving fruits. A convenient size of bottle is one about 12 inches in height, and about 8 inches in diameter. The size and shape of the bottle is of course unimportant, but it is desirable that it has a wide mouth to facilitate the introduction of articles and of the hand into its interior. The accompanying diagram explains the points about the vessel better than my description would. Vide drawing.

When the top is screwed tightly on to the neck of the bottle, the flange presses firmly on the rubber ring, the bottle is in consequence air-tight. The length of days of rubber preserved in such a vessel is proportionate to the number of times the jar is opened, i.e., if the jar is not opened at all, the rubber will remain good for an indefinite period. As it is most essential that the vessel be air-tight, one must look well to the rubber bands. The best place to preserve them when not in use is the interior of the jar. It is of importance that as little kinking as possible should occur in packing the articles in the jar; it is also well to rub a little vaseline on the metal portions of apparatus it is intended to preserve, as bright metal loses its lustre in the jar.

A handy method of preserving catheters, bits of rubber tubing, &c., is to place them in an ordinary wide-mouthed glass-stoppered surgery bottle, in the hollow of the stopper of which some wet tow is placed. For atticles in frequent use this is a preferable plan to the above-mentioned method.

#### CALF INOCULATION.

ABSTRACT OF LECTURE DELIVERED AT THE LONDON SCHOOL OF TROPICAL MEDICINE.

By LIEUT,-COL. RUNDLE, I.M.S.

Healthy calves, preferably female, of between one and two years of age (roughly judged by seeing that no tooth is shed) are selected. A day previous to the operation the abdomen of the calf from the umbilicus, and the inner and upper third of the thighs, is clean shaved. The lymph is inserted by "punctures" or "the line method"—scratches one and a half to two inches long, about one inch apart from one another. These punctures and lines are made as superficial as possible, and bleeding is avoided. In inoculating calves for the cultivation of vaccine only, punctures are used so that there may be as little irritation as possible; but for paste the "line method" is adopted. When it is difficult to obtain calves both punctures and lines are made on the same calf—the punctures being made around the teats or scrotum and over the perineum, and the lines are made over the rest of the abdomen and the inner surface of the thighs.

The calf from which the lymph is to be taken and the calf to be operated on are tied down on tables; a broad leather collar round the animal's neck and straps round the fore and hind legs will be found of assistance, as a strong healthy calf will often resist vigorously, and if only held on the table will sometimes free itself by a sudden kick or two.

For making the punctures a broad German lancet may be used, and the lymph inserted with the point of the same instrument. The lines are made with an ordinary vaccinating or bleeding lancet, and the lymph well rubbed in by means of a flexible spatula. To prevent the calf from licking the abdomen a broad piece of clean cloth is placed round the abdomen and the broad leather collar is worn; if a couple of rings are attached on either side of this collar the animal can be tied up easily. From the fourth day after the operation the animal is examined morning and evening, and when the puncture vesicles are full and their contents clear, the lymph is transferred to other calves; and whenever the remaining vesicles have filled in, and before the lymph in them begins to turn turbid and the areola begins to form round them, they are gathered for paste.

The method is as follows: -The vesicles are first washed with soap (without antiseptics) and plenty of sterilised water at about 100 degrees F., and carefully and thoroughly cleaned one by one with a clean, thin, white towel soaked in water, and then covered with a wet towel to keep them soft. Wiping a few vesicles dry with a clean dry towel, the operator stretches one of them well between the thumb and index finger of his left hand; he then with a bleeding lancet—the point of which has been broken off and made blunt-scrapes off the vesicle clean with one gentle sweep of the instrument without drawing blood. The vesicles thus collected are received into the glass pan of an ordinary apothecary's pair of scales. After weighing transfer the mass to an agate mortar, and pulp well until the whole becomes a homogeneous mass. To this anhydrous neutral lanoline is added and well mixed up-six parts of lanoline to one of vaccine pulp.

The lanoline paste is issued in glazed earthenware

pots or in amber-coloured glass tubes.

The average amount of lanoline vaccine got from a calf varies from quantities sufficient for 400 to 800 cases.

The inoculation of calves may be carried out (1) with supplies of bovine lymph obtained from the National Vaccine Institute; (2) with humanised lymph; (3) bovine scabs and humanised lymph, the scabs being pounded up in an agate mortar with glycerine.

Cowpox and horsepox are simple modifications of

human smallpox.

The so-called vaccine is not an eruptive disease peculiar to the cow, but is produced by transmission of human smallpox to it, and man, not the cow, is the source of the disease.

The mild disease thus caused in the cow can by direct transmission from the cow to man produce in him a mild disease which gives protection against natural smallpox.

In 1883 Dr. Simpson, then of Aberdeen, obtained smallpox lymph from an unvaccinated female, (a) on the fifth day of the eruption, (b) on the sixth day of the eruption.

On November 11 he inoculated a cow on one teat with one scarification with lymph taken on the fifth day, and on another teat with two scarifications with lymph taken on the sixth day.

On November 17, the seventh day after, the single scarification yielded fifteen points; the two scarifica-

tions done with the sixth day lymph only became papular.

Nov. 10. Small-pox virus obtained from J. P., aged 13.

Nov. 11. Cow inoculated.

Nov. 17. Fifteen points charged from vesicle and sent to Lamb's Conduit Street from

Nov. 21. Calf 938, aged 6 months, vaccinated.

Nov. 26. Child Calf 941.

Dec. 1. Child Calf 996.

Calf 948 Calf 947.

It is mentioned that the inoculation of *smallpox* on animals is a difficult matter, and only few succeed. Such, however, is not the case when animals are vaccinated with current, that is, human lymph.

There is no difficulty if lymph be taken on the eighth day from the "mother vesicle" of an inoculated human individual, but in England the law does not permit you to inoculate anyone with small-pox lymph.

# ALCOHOLISM ON BOARD SHIP AND HYPERPYREXIA.

By Dr. J. A. MACKENZIE.

THE following cases forcibly illustrated the effect of allowing alcohol to be issued to passengers addicted to drink on board ship.

Dr. J. A. Mackenzie, during voyages between the West Coast of Africa and England, reports that a first class passenger died on board the "outwardbound" steamer to which he was surgeon, in January, 1901, of acute alcoholism and uræmia. On the homeward passage in the same steamer, C. R., a second class passenger, a miner, died of hyperpyrexia from the effects of alcohol, plus malarial infection.

C. R. had been working upon some gold mines upcountry for eighteen months, this being his second tour of service. He had repeated attacks of "fever" and had been a heavy drinker.

#### SUMMARY OF SYMPTOMS.

February 20.—2 p.m., temperature 102 degrees; hot limejuice, quinine grs. 20. 5 p.m., temperature 103 degrees; haust. nig. 1½ ozs. 7 p.m., temperature 103·8 degrees; phenacetin, grs. 5. 10 p.m., temperature 105 degrees; phenacetin, grs. 6. 12 midnight, temperature 105·6 degrees. Bowels acted freely and he took a breakfast cupful of thin arrowroot.

February 21.—4 a.m., temperature 102 degrees. 8.30 a.m., temperature 100 degrees. 12 noon, temperature 99 degrees. 7 p.m., temperature 98 6 degrees. During day had two 5-grain doses of

quinine, and took both arrowroot and bovril in fair quantity.

February 22.—Temperature remained normal, and patient went out upon deck for a few hours under the awning. Took some light food. Two 4-grain doses of quinine.

February 23.—Temperature remained normal. Patient took a fair quantity of food and expressed himself well. One 5-grain dose of quining

himself well. One 5-grain dose of quinine.

February 24.—Procured through his friend a bottle of whisky, of which, I am given to understand, he consumed the major portion. He remained upon deck late, contrary to my advice. Called to see him at 12 midnight. Temperature 106 degrees; phenacetin grs. 6; severe vomiting; enema quinine, grs. 30.

February 25.—1 a.m., temperature 107 degrees; cold pack. 2 a.m., temperature 108 degrees. 3.15 a.m., temperature 109 degrees; died. Temperature rose to 110 degrees half an hour after death.

Dr. Mackenzie adds that a week before joining this ship the patient, with two fellow-workmen, walked thirty-two miles through the bush down to Axim, where one of his companions died suddenly from "fever."

# MULTIPLE LIVER ABSCESS DUE TO ASCARIS LUMBRICOIDES.

By J. C. Thomson, Hong Kong.

The body of a Chinese female child, about eight years of age, recently found by the police at Hunghom, a village in British territory opposite to Hong Kong, showed a condition due to the presence of ascaris lumbricoides, which is fortunately uncommon. I found the liver greatly enlarged, and riddled into small abscesses, varying in size from a mere point of pus to cavities of an inch in diameter. In the larger cavities and throughout the liver-ducts there were numerous round worms, which had, by the irritation of their presence and by blocking the bile-ducts, caused the multiple abscesses. The intestine was packed with the parasites, and the stomach contained a mass of them as large as a man's fist. The body was much emaciated, but the organs were otherwise quite healthy.

THE DISTRIBUTION OF ANOPHELES IN ELLICHPUR CANTONMENT, STATE OF BERAR, INDIA.—Dr. W. Glen Liston, Capt. I.M.S., in the *Indian Medical Gazette* of April, 1901, states that when adult *Anopheles* mosquitoes are most abundant, viz., in September, October and November, malarial fever is most prevalent; and that coincidently with the diminution in the number of cases of malaria there is a decrease in the number of both the breeding-places and the adult *Anopheles*.



KELOID.
From a photograph sent by Dr. CRAN, Belize, British Honduras.
See page 171.



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THE

## Journal of Tropical Medicine

May 15, 1901.

### THE GEOGRAPHICAL DISTRIBUTION OF SURGICAL AILMENTS.

WE are so engrossed in what we might term the purely medical aspect of diseases in warm climates, that there seems but little attention being paid in these regions to the study of diseases of a surgical nature. We know that there are several diseases which relax, and several which increase, in virulence as the tropics are approached; and others again, such as plague, which appears to find its most favourable nidus on the sub-tropical borders, for in both the equatorial and in the temperate regions it has failed in modern times to flourish. Many other diseases, such as measles, scarlet fever, rheumatic fever, leprosy, yellow fever, beri-beri, cholera, &c., are modified, diminished or increased according to what appears to be climatic influences, but whether this is the real explanation or not is perhaps an

Literature is rich, though ceropen question. tainly not yet nearly rich enough, in facts appertaining to the geographical distribution of "medical" ailments; but our surgical records as regards warm climates are blank indeed. Not that we do not hear of this or that major operation from time to time; but surgery is more than cutting, and surgical ailments ought to be studied from more points than that of operation merely. Yet it is only of operations we hear, of so many lithotomies or lithotrities, of the size of a scrotal tumour removed, &c., &c.; all useful in their way, but such contributions, although they add something to the art, do but little for the science of surgery. If surgery is to retain its position as a science, the basis must be on a wider and surer foundation than merely recording the surgical fashion of the moment.

We would urge on our readers, therefore, to collate and record their experience of surgical as well as of medical ailments. The field is large enough to satisfy any one, and important enough to justify the short time and the infinitesimal trouble necessary to produce useful work. There is nothing intricate or prohibitive in gaining the surgical knowledge wanted.

A mere statement of cases observed in daily work, whether in hospital or in private, is all that is necessary, and nothing is too insignificant to be recorded: for instance, what tumours of a malignant or non-malignant character seem to prevail in a district; or is the absence of growths, whether malignant or benign, conspicuous. negative statement is as valuable as a positive, for without it geographical knowledge of disease is impossible. Again, is hare-lip or other congenital deformities common, uncommon, or unknown in your practice? Is hernia a common complaint; are varicose veins often seen; are piles, ischio-rectal abscess, fistula, rectal cancer, &c., surgical ailments of common or rare occurrence? Is appendicitis a disease seen in natives to any extent? We know little or nothing about the geographical distribution of rickets, uterine tumours, tubercular diseases of lymphatic glands, of the testicle, of bones, &c. These queries might be multiplied to include the whole of the diseases of surgery, and profitably so, and information should include all and every surgical case of whatever nature.

Such questions as the origin and composition of urinary calculi, and of gall stones, although partially known and investigated, have only been really touched upon.

Dr. Campbell Highet, of Bankok, sent a most admirable account of the eye diseases met with in his practice to this Journal on March 1, 1901. This article might serve as a type to go by for general surgical ailments. From such an article a definite idea of the eye diseases of a district, as distinct from eye operations and isolated cases of more or less unique nature, is obtained. The absence or presence—in other words, the geographical distribution-of disease upon the broadest basis is procurable only by each practitioner stating his individual experiences. such a gathering of information a useful compendium and a great accession to our knowledge, practical, scientific and historical, would result. Work in this field is simple in the extreme; it necessitates no time spent in a bacteriological laboratory, no prolonged staining of tissues or microscopic investigations. It is a field open to every practitioner, and by joining in it the medical man will gain information which will probably astonish himself by its extent, and will certainly add immensely to our knowledge of surgical ailments in warm climates.

### Translations.

A NOTE ON REMITTENT CLIMATIC FEVER IN THE FRENCH FLEET OFF BIZERTA.

By Dr. Valmyre. (Translated from the French by P. Falcke).

On November 7, 1900, I sent four samples of water from the Baie sans Nom to the laboratory of the Pasteur Institute at Tunis to be analysed.

Sample I. was taken from the well of the Café Ernest; sample II. from a jar with a capacity of 150 litres from the Café du Gaulois; sample III. from the Fleet; and sample IV. from the cistern of the Café Muller.

This measure was adopted in consequence of a

number of our marines having been taken to the Military Hospital suffering with typhoid fever.

On November 17 the laboratory assistant sent me

the analysis of the samples of water.

The report says: "Sample III. is drinkable from a bacteriological point of view; as to the three other samples, though the presence of Eberth's bacillus is not confirmed by analysis, bacilli coli abound. There are therefore grounds for regarding these waters with grave suspicion in normal times and for forbidding their use in times of epidemics unless first boiled and subsequently ærated."

The point that struck me on reading this report was the fact that we had patients suffering with typhoid fever on the Fleet, where the water is drinkable from a bacteriological point of view, whilst there were no cases of illness in the cafés in the vicinity, the waters

of which are "very suspicious."

The question is, How to explain this contradiction between the analysis and facts? Have all the men admitted to the Military Hospital for typhoid fever really had this illness?

There were eight men, Van—, Mim—, Morz—, Pa—, Cha—, Lo—, Laf—, and

No. 29, native.

First of all I eliminate Laf——, a stoker from la Flèche who had not been ashore for two months, and who is a case outside the Fleet.

Next I must eliminate No. 29, native, who about this time was discharged from the hospital, his

diagnosis being gastric disorder.

After an attentive study of the clinical sheets of the six other patients, enquiry of the doctor in charge, and the assistants of the ward of the Military Hospital, and personal observation, I have come to the conclusion that Lo—, and Mim— only have had typhoid fever, while Van—, Morz—, Cha—, Pa—, and the other patients treated at the Infirmary at la Baie sans Nom, Et—, Cha—, Han—, Pie—, Ker——, have had an affection specially characterised by a prodromal period, a period of pyrexia with high temperature, absolute insomnia, constipation or diarrhoea, then a period of apyrexia, temperature of about 37° C., with a remission of all the symptoms, finally a new feverish period of short duration, which is followed by convalescence, the whole course of the illness lasting between fifteen and thirty days.

The following table exhibits the course of this

affection :-

		NAMES			DAYS					
ATAMEN					Pyrexia	Apyrexia	Pyrexia			
Pa					10	12	7			
Van					7	2	5			
Morz					15	16	2			
Cham					14	3	1			
Han					9	6	2			
Etch					5	3	4			
Char					12	2	5			
Pier					10	8	3			
Kerd					13	2	2			

The course of the illness was as follows: a prodromal period of some days, during which the patient feels discomfort, insomnia, want of appetite, lassitude,

diarrhœa or constipation. When the patient comes to be treated, he exhibits a temperature of from 38° to 40° C., the symptoms enumerated above then become intensified, the eyes are bright, the face pale, the abdomen exhibits no peculiarity except some rumbling, the temperature remains high during a period of from five to fifteen days.

Sometimes the temperature falls to 36.5° C., generally, however, the average is about 37° C. This period of apyrexia lasts from two to sixteen days; then without any apparent predisposing cause such as food, &c., the temperature again rises suddenly for five or at most six days, and then convalescence

begins. The following conditions are observed simultaneously

with the fever :-

Digestive Organs.—The tongue is furred down the centre, the sides being reddened, some vomiting at the commencement, also constipation, or diarrhœa with ochre-coloured stools, of a fætid odour; transient congestion of the liver, little or no abdominal flatulence; some rumbling in the right iliac fossa, pressure on which is not attended with pain; there were never involuntary evacuations.

Circulatory Organs.—Pulse agitated during the febrile period in one case (that of Morz) dicrotic, heart good, spleen palpable in one single case (that

of Van——), no intestinal hæmorrhage, no epistaxis.

Respiratory Organs.—Never any dyspnæa, nor bronchitis and laryngitis, in fact never any pulmonary

symptoms.

Urinary Organs.—Urine clear or with sediment, rich in carbonates and phosphates; no albumen and

no biliary pigment.

Nervous System.—Sometimes stupor, more especially at the beginning of the illness; absolute insomnia during the whole of the illness; no delirium, intelligence unimpaired; patients were aware of everything that went on around them, and always answered questions correctly.

General Symptoms.—Complexion pale, no prostration, manifest wasting, and loss of strength; the patients were always able to go alone through the ward to make use of the hygienic pail placed in a

corner to receive evacuations.

The course of the illness is not a disquieting one, and exhibits no complications. Convalescence is somewhat tedious.

What is this affection?

Is it gastric malarial fever? I doubt it, for though no examinations of blood were made, salts of quinine, whether administered by the mouth or by injection, was quite inefficacious, and the patients, once convalescent, never exhibited relapses.

Is it typhoid fever of medium intensity?

In both illnesses one finds prodromal symptoms, consisting of diarrhœa or constipation, insomnia, and a high temperature on the evening of the fourth day. But the course of the illness is different, the temperature chart always exhibiting a remission, followed by a renewed rise; the total absence of chest symptoms (bronchitis, laryngitis), and the slightness of the nervous symptoms, the lightness, if not absence, of abdominal symptoms (tumefaction of the spleen, lenticular pink spots, pain on pressure of the right iliac

fossa, abdominal flatulence), to my mind differentiate these two illnesses; the analysis of the water on the men-of-war yielded the fact that, from a bacteriological point of view this water was pure, and it is a well-known fact that water is the usual vehicle of Eberth's bacillus. Again, taking into consideration the absence of true typhoid fever in the town and garrison, it is difficult to admit that we only should have been attacked by this ailment. It seems to me more probable that the few cases amongst civilians considered to be typhoid, were as a fact, of the same nature as those we had on the Fleet.

May not our vicinity to Malta lead us to suspect that Mediterranean fever, endemic on that island, is the true diagnosis of our illness? In both illnesses there is fever, diarrhoea or constipation, curious variations of temperature; but in Mediterranean fever there is a different evolution; the acute stage is attended by pulmonary symptoms, profuse sweats and delirium, the latent (monotonous) period lasting about twenty-four days, is characterised by an amelioration of the digestive symptoms, the persistence of sweats, and the appearance of pains of the nature of rheumatic orchitis.

It will be observed that nothing similar to this

occurred either on the Fleet or in hospital.

The illness described by me seems therefore to be a specific ailment, and although bacteriological evidence is lacking, it would seem that it is of a microbic nature, as evinced by its prodromatæ, its special course, and its long period of convalescence. As to the question of its contagiousness, I do not consider it to be so. The cases which I had under treatment came from various ships.

In the infirmary I observed no case of contagion. I am of opinion that there is a microbe, but what is it? I reject Eberth's bacillus and Laveran's hæma-

tozoon, for reasons stated above.

The idea of considering the Coli communis as the agent of this illness is strengthened by the confirmation of the presence of this bacillus in the waters of the establishments near the Fleet, and which were frequented by our patients, as I found on enquiry.

Moreover, we are aware that this microbe is the constant host of the human intestine, and that under the influence of intense heat, atmospheric electricity, damp, great variations in the night and day temperatures, agricultural work, and, in brief, on every occasion which causes any individual to be run down. This bacillus acquires virulence, becomes noxious, and sometimes causes symptoms so serious that they have been thought to be originated by Eberth's bacillus, until bacteriological examination has refuted the presence of the latter.

I admit that the bac. coli may, by its toxin, have given rise to the symptoms described in this article, but I cannot say whether the germ came from outside, or whether its virulence was heightened in our men

during the past months.

In common with other authors I call this illness remittent climatic fever; that is to say, a feverish gastric disorder, transformed, enlarged on this tropical coast of the Mediterranean, where it acquires a greater importance than it has in France, its duration being doubled or trebled by the exaggeration of its symptoms.

This febrile gastric disorder, which must not be confused with even slight typhoid fever, has existed here the whole year. It has been of short duration during the winter, but during the intense heat of August it acquired great tenacity and particular intensity. In September and October some cases, until the seventh day of illness, gave one the impression of actual typhoid fever, but the subsequent evolution of these cases were such that the most sceptical were obliged to accept the diagnosis as that of a gastric febrile disorder. Besides these almost classic cases some others occurred, the evolution of which demanded a special appellation.

Thus from September to the beginning of November we had in the Fleet many cases of simple feverish gastric disorders, nine cases of remittent climatic

fever, and two cases of typhoid fever.

It is difficult to explain this last-mentioned illness, as its usual agent, water, did not contain any germs, and there were no cases either in the garrison or in the town. It is also difficult to explain away the contradiction mentioned at the commencement of this report.

On studying the history of disease of Mim—— and Lon—— I found that they recently arrived from Toulon, where typhoid fever is endemic, and the idea that these young sailors took the germs of the illness in this town is changed to certainty, on remembering Verneuil's opinion on latent microbism.

The treatment of remittent climatic fever is that adopted for febrile gastric disorders. Some cases, in consequence of the rise of temperature of the first stage, necessitated cold baths; but hygienic care, alteratives, and intestinal antiseptics were sufficient in most of the cases.—Archives de Medicine Navale, March, 1901.

## NAVAL MEDICAL OFFICERS' GRIEVANCES.

[Reprinted from the Naval and Military Record, May 9, 1901.]

Sir,—In your issue of April 18 appeared a letter from a correspondent respecting the difficulty of recruiting medical officers for the Royal Navy. In reality there is no competition for entry, and, with a few notable exceptions, no acquisition of men of first-class ability, such as former hospital house-surgeons or University graduates. Your correspondent also dwelt on the recent suspension of voluntary retirement in all ranks, from the recently-entered surgeon, who realises that naval life is unsuited to him, to the fleet surgeon, who has served on with a prospect, or promise, that in that rank retirement with pension would be granted.

In the same issue was a letter that recently appeared in the *Times*, specifying other disabilities of naval medical officers which, it is firmly believed, affect recruiting from medical schools of young qualified

medical men of superior attainments.

The *Times* correspondent, evidently with an expert knowledge of the present feeling of his brother officers, specifies—

(a) The out-of-date rate of pay they receive. The Medical Council, by abolishing the employment of

unqualified assistants in civil practice, have raised the "market price" of young qualified medical men very considerably, in fact doubled it, while the demand for such men of superior qualifications in our colonies, territories, and spheres of influence has further enhanced their pay and emoluments.

The pay of medical officers on entry is virtually the same in the Royal Navy, the army, and the Indian Medical Service, and this was fixed over twenty years

ago.

(b) Study leave. The necessity fer this in the present day is fully recognised in civil practice; hence the post-graduate courses and the recently established

Polyclinic in London.

Although this essential privilege has been granted recently to some few senior fleet surgeons, owing to the small establishment of naval medical officers the privilege has been denied to surgeons returning from their first foreign commission, by which time they have probably realised that their qualifying examination for degree or diploma, or for entry into the Royal Navy, was no indication of their ability to treat the diseases of foreign climates according to the most recent discoveries and researches in those diseases which are now so efficiently treated at the Tropical Disease Schools at the Albert Docks, London, and at Liverpool in post-graduate courses.

The importance of this post-graduate study was recognised fully by the late Admiralty Departmental Committee, under the presidency of Admiral Moore, but it seems doubtful if it is fully appreciated at the

Naval Medical Department.

There is a still further naval medical grievance, viz., the denial to these officers alone of extra pay for extra duties. This dates from the economical administration of the naval medical service a few years ago—an economy carried out at the cost of efficiency and reform in the medical personnel and the hospitals of the Royal Navy which the present more liberal-minded administration has found to be a fine field to cultivate and

improve, but not thoroughly so far.

In this connection, I am reminded of the action of a Commander-in-Chief on the China station some years ago who cut down everything that was possible, including the sale of invaluable naval property at Hong Kong and Shanghai, which can only be recovered at immense cost. One of his captains, who will be recognised by many senior naval officers under the familiar and affectionate sobriquet "Daddy," suggested to his chief that to put the finishing stroke to his reign of economy he should hand over his command to a lieutenant. Suffice it to say that the Commander-in-Chief did not concur in his suggestion!

A sub-committee of the British Medical Association has recently considered and reported on the army medical service, specifying their views as to the necessity for reform and the reforms considered necessary in their opinion. As this in the main equally applies to the naval medical service, allow me to briefly record the reforms stated as essential to the efficiency of the Royal Army Medical Corps:—General undermanning; insufficient pay; insufficient professional inducements, ambitious students are deterred from the army (substitute Royal Navy) because they see no encouragement or reward for professional excel-

lence only; the examinations for entry of duly qualified medical men in elementary subjects instead of in advanced medicine, surgery, hygiene, bacteriology and analysis; seniority promotions which are too much the rule in the army (and Royal Navy, as "M.O.R.W." pointed out in the "Times" letter); disabilities of house surgeons of civil hospitals on entering the public medical services, where they are liable to find themselves junior to contemporaries who may have been entered direct after qualification.

Thus a most desirable class of recruits are lost to the public services where professional ability, even in the medical branches is unrecognised, while the luck of war service, irrespective of necessary professional or administrative ability, wins promotion to the highest

ranks, with honours.

I write with a personal knowledge of the naval medical service from a little before the present rates of pay were fixed, and from a large acquaintance with the present personnel of that service, but will venture to sign myself

SPERO MELIORA.

#### ON THE TREATMENT OF DYSENTERY BY LAVAGE.

[Reprinted from Medical Archives of the Federated Malay States.]

By W. LEONARD BRADDON, F.R.C.S.

A REPORT is here given of the results obtained in the treatment of 337 cases of dysentery in Negri Sembilan hospitals during the past year.

In introducing this matter to notice it may be pointed out that dysentery (and chronic diarrhea) still form the most fatal among disorders treated in our hospitals.

In the hospitals of the Colony and the Native States the case mortality of the former disease was

returned as follows for 1899:-

				Cases of				
				Dysenter	y. :	Mortalit;	y.	Per cent.
Singapore	e Hospital	S		474		199		42
Penang	,,			228		105		26
Malacca	,,			103		30		29
Province	Wellesley	Hosp	itals	70		35		50
Perak Ho	spitals			1,407		342		24
Selangor	Hospitals			659		187		28
Negri Ser	mbilan Ho	spita	ls	_		-		. 17

There is room therefore for great improvement in our treatment of this disorder. In the Nigri Sembilan the case mortality in 1896 was 33 · 3 per cent., in 1897 34 · 4 per cent. In 1898 it fell to 17 · 88 per

In that year the method of treatment was first tried to which attention is now drawn.

The cases were classed according to nationality and age. Note was made as to the presence or absence of amœbæ in the stools. In treatment by ipecacuanha preparations, the use of large doses of the root with a preliminary stomachic sedative, and the use of small doses of Dover's powder, sometimes combined with bismuth or other astringent, or an internal antiseptic was included. In treatment by sulphate of magnesia the usual method was pursued, a tablespoonful of saturated solution of the salt being administered every hour until bleeding and tenesmus were relieved. In lavage, the routine was to thoroughly wash out the whole colon by douching with several pints of solution at 35 degrees. A quantity of solution sufficient to fill the whole colon could, it was found, be easily retained without any discomfort if run in slowly while the hips were well elevated.

Attention will only be drawn to the results of the modes of treatment employed: -

#### (1) SEVENTY-SEVEN CASES TREATED BY PREPARATIONS CONTAINING IPECACUANHA.

The mortality was 311 per thousand; recoveries under 20 days, 778 per thousand; recoveries under 10 days, 415 per thousand; the remainder occupying various periods up to and over three months.

#### (2) EIGHTY-EIGHT CASES TREATED BY SATURATED SOLUTION OF SULPHATE OF MAGNESIA.

The mortality was 236 per thousand; recoveries under 20 days, 745 per thousand; recoveries under 10 days, 450 per thousand; the remainder all, eventually, within three months.

(3) ONE HUNDRED AND SEVENTY-TWO CASES TREATED BY LAVAGE COMBINED IN SOME CASES WITH ASTRINGENT AND OTHER DRUGS.

The mortality was 180 per thousand; recoveries within 20 days, 743 per thousand; recoveries within 10 days, 476 per thousand. Of the forms of lavage used, the best result appears to have been obtained with a solution of boracic acid. Eighteen cases were treated by this method without a death.

The next best result was by lavage with the same solution, aided by the exhibition of a mixture of bismuth, Dover's powder and salol in equal parts: mortality 125 per thousand. Lavage with quinine solution only, and the same aided by simple astringents given by the mouth, afforded the next best results: mortality 229 and 227 per thousand.

As regards the severity of the cases treated, the mildest cases, as might be expected, showed the best results; the mortality in cases where stools were under 10 per diem being 184 per mille; when they were 30 or more, 920 per mille. The former formed by far the largest proportion of cases—viz., 738 per thousand.

Viewing the methods of treatment with regard to the severity of the case dealt with, it is seen that the treatment-group exhibiting the greatest mortality—the ipecacuanha series—was also that in which the mildest cases were most numerous-805 per thousand having under 10, 90 per thousand under 20, and 103 per thousand 30 or more stools

Of the cases treated by lavage fewer belonged to

the mild groups (691).

Of the most severe cases (38 in all) 20 treated by lavage, 10 with quinine solution, and the salol, bismuth and Dover's powder combinations in addition, the mortality was 263 per thousand.

As regarded the presence of amœbæ, that point was determined in 113 cases, in 41 of which they were shown to be present, in 72 absent. The mortality differed little in the two series. With respect to nationality, Chinese formed 379 per mille, Tamils 560 of cases treated. The mortality was higher among the former (250 as against 203).

The conclusions offered are:

(a) That lavage of the colon with antiseptic solutions is the best method of treating dysentery as met with in the Malay States.

(b) That the lavage to be effective should be

copious and frequent.

(c) The most useful solution is a weak solution of boracic acid.

(d) The use of astringents and antiseptics, such as bismuth, Dover's powder and salol, is beneficial when lavage is being also carried out.

(e) Saturated saline solutions given per oram are less useful than lavage, although they have their place in treatment.

(f) Ipecacuanha is the least successful of the medicaments in practice.

# NOTE ON THE OCCURRENCE OF "GOUNDU" OR GROS-NEZ IN THE MALAY PENINSULA.

[Reprinted from Medical Archives of the Federated Malay States.]

By W. LEONARD BRADDON, F.R.C.S.

THREE instances of this affection, described as common in Western Africa, have come under my notice. The patients were two of them Boyanese

(natives of Sumatra), one a Malay.

The affection, which has been lately well described in the Journal of Tropical Medicine, consists in a slowly growing tumour, generally symmetrical in size and shape, at the angle between the nose, the orbit, and the forehead on either side, and is apparently due to a sub-periosteal chronic inflammatory process involving the nasal process, and perhaps orbital plate of the superior maxilla, and the nasal bone. The swellings are smooth and firm, even hard to touch.

The overlying skin is not involved and is free of inflammatory signs. The tumours produce no pain, and unless growing to such a size as to interfere mechanically with vision do not in any way trouble the patient. In cases described elsewhere a history of previous discharge from the nares has been given, but there was no account of this in my cases. The patients desired no interference, and were unwilling to allow removal of any portion by exploration for culture purposes. There would appear to be little doubt of the specificity of the characters of this affection, as a disease sui generis; of the usual natural termination of such cases I have no information.

## PRIMARY SPLENOMEGALY.

Brill records three cases of splenic enlargement occurring in one family, which, he believes, must be classified as primary overgrowths. The family history, paternal and maternal, is good. The mother of the three patients has had six children, of whom two are in good health, and one died of marasmus at 3 years of age. The youngest child, who was not seen by the author, died when 9 years of age from asthenia, with a great enlargement of the spleen, no examination of the blood having been made. The second of the cases occurred in the third child, who is now 34 years of age. The enlargement was first noticed in 1888. There is no history or sign of malaria, syphilis, rickets, or tuberculosis. lymphatic glands have never been enlarged. patient had suffered from hæmorrhagic rashes and from bleeding from the gums. In 1895 the blood count was: red cells, 4,800,000; white, 7,168; hæmoglobin 80 per cent. The spleen now extends to within a few centimetres of the right superior anterior iliac spine. The last of the patients, male, aged 30, has no history of syphilis, malaria, or Slight enlargement of the spleen was found by examination in 1889, since which time the patient has been treated by Fowler's solution at intervals. There have been attacks of epistaxis from time to time since 1890, but the man has not ceased work till an attack of dysentery in 1900. In October, 1900, the spleen reached the middle line three centimetres above the umbilicus, the liver was distinctly enlarged, and there was moderate anæmia of the chlorotic type. With regard to the last two cases, Brill excluded malaria, syphilis, tuberculosis, and amyloid disease by the history. Repeated examinations for the plasmodium malarize gave negative results. The absence of fluctuation excluded echinococcus cyst. Passive hyperæmia was disproved by the extent of the enlargement and the absence of recognisable cause. The long duration of the cases, the complete resistance to treatment, and the fact that the anæmia did not occur in either case for more than ten years after the onset, and then was only slight in extent, present a complex of symptoms very different from that of the so-called splenic anæmia. The absence of any subjective sign of distress in spite of the great overgrowth of the spleen is noticed as remarkable.—Amer. Journ. of Med. Sci., April, 1901.

# ERADICATION OF YELLOW FEVER IN HAVANA.

In his letter accompanying the report of the vital statistics of Havana for March, Major Gorgas, the chief sanitary officer, calls attention to the fact that Havana at last is free from yellow fever. He expresses the opinion that never before has that city been so long free from the disease, and attributes the present conditions in a large part to the systematic war waged on mosquitoes during the month

of March. He has, he says, the strongest hopes of destroying the foci in that way. In former times and even since the American occupation the milder types of the disease passed largely unrecognised, and no such strenuous attempt was made to report them as is the case at present. Hence the significance of present conditions, and it is evident that the health authorities of Cuba are trying to verify clinically as well as experimentally the mosquito origin of the prop gation of the disorder. This is only the beginning of the clinical test of the theory, but it is apparently a promising one. If they succeed in stamping out yellow fever, this result alone will be worth all the cost of the Spanish-American War. What can be done in Cuba can be done also elsewhere, and with this scourge of the American tropics, and malaria, eliminated, the area of the habitable globe will be appreciably increased for the white race, to say nothing of the removal of the danger to our southern coast from Cuban foci of the disease. -Journ. Amer. Med. Assoc., April 27, 1901.

An expedition to investigate the practicability and the possibility of affording protection on a large scale against mosquito bites, as a prophylaxis in malaria, is to proceed from Liverpool to West Africa shortly. Major Ronald Ross goes with the expedition, at least for a time, to select an appropriate locality at which to start work. The expedition owes its origin to the liberality of a generous donor, but one whose name has not been allowed to transpire. Every one, layman and doctor, must be deeply interested in an expedition of this nature, and we wish its members success in their noble work and safe return.

## Correspondence.

To the Editors of the Journal of Tropical Medicine.

GENTLEMEN,—Under separate cover I have forwarded you

a photograph of a large keloid.

The history of the case is that the boy got severely burnt on the buttocks. He was entirely neglected by his relatives, until the sores got full of maggots. After this they washed it now and again, and applied some kind of oil. Altogether it took several months to heal. When I saw him it was in its present condition. The tumour averages about 1 in. in depth and has a somewhat regularly honeycomb appearance all over. The finger-like processes are particularly well-marked. In the middle of the right buttock there is a part of it whitish-looking and almost of horny consistency.

Small keloids are fairly common here, especially about the hands and face, but this is much the largest I have yet seen. It is peculiarly sensitive to touch, but not painful on

pressure.

Yours very sincerely, Jas. Cran.

Belize, April 18, 1901.

## Current Miterature.

#### CHOLERA.

In a paper read before the Bombay Medical and Physical Society, on January 18, 1901, and published in full in the Lancet of April 20, 1901, Dr. George Lamb, Capt. I.M.S., gives in detail the results of his investigations as to whether any relation could be traced between the incidence of cholera and the prevalence of comma bacteria in the well water of Gujerat. The inquiry was undertaken during the period of famine in the month of May, 1900. The result of the research was to show that none of the comma-shaped bacteria which were isolated from these wells could be termed a true cholera vibrio, but that they belonged to the tribe of curved bacteria, of which the true cholera microbe is one. The relation between the presence of these comma-shaped organisms in the well water and the prevalence of cholera in the district was fairly conclusively proved. In fourteen of the localities, in which the well water was examined, it was found that in eight the comma-curved bacteria were found and in six they were absent. In the eight districts where the bacteria were found, cholera prevailed at the time, or immediately after the period of examination, and in the six where it was not found no cholera existed. These observations, as well as others conducted in Calcutta by Mr. Haffkine and Professor W. J. Simpson, tend to show that without having any information as to the actual prevalence of cholera, the bacteriological examination of the waters of a district would give a useful warning as to the danger from cholera which exists in these districts. The importance and farreaching hygienic practical results of an investigation of the kind are at once apparent; for by bacteriological search for the presence or absence of comma-curved bacteria in the well water, the incidence of, or freedom from, cholera outbreaks, could be anticipated and guarded against, or accurately prognosticated. All wells, even in an infected district, are not always contaminated by comma-shaped bacteria; and the fact that some are and some are not so contaminated. determines which well can and which cannot be used, thereby avoiding the necessity of evacuating a locality when a few cases of cholera appear.

#### TYPHOID.

Typhoid Fever in the Natives of India; its Diagnosis by Means of the Serum Sedimentation Re-action.—Dr. George Lamb, Captain I.M.S., after a study of the serum sedimentation re-action in cases of "fever" in Bombay, has come to the conclusion that typhoid is much more common amongst natives, especially children, of India, than is commonly supposed. Captain Lamb holds that in many of the so-called continued and remittent fevers in India, it is impossible to come to an accurate diagnosis by watching the clinical symptoms alone, and that even post-mortem appearances, unless supplemented by a bacteriological investigation of the organs, does not in every case suffice to prove the absence or presence

of the bacillus typhosus. He draws attention to the fact that there are many cases on record of the nature of a typhoid septicæmia, in which the characteristic intestinal lesions of typhoid are absent, and in which the diagnosis can only be made clear by the serum agglutination test during life, or by the isolation of the specific bacillus from the spleen and other organs after death. The primary objects of the investigation made by Captain Lamb are: (1) To emphasise the fact that in serum agglutination and sedimentation we have at hand a trustworthy and rapid method of assisting in the differentiation of tropical fevers; (2) to point out that cases of typhoid infection are much commoner in the natives of India than is generally supposed, and are in some instances only able to be recognised by means of the re-action which the serum gives with the specific bacillus.

Captain Lamb gives in detail a number of cases submitted to the serum sedimentation re-action test, and his results go to confirm the value of the test in the differentiation of tropical fevers of doubtful type.

Note on the Results obtained by the Anti-Typhoid Inoculations in Egypt and Cyprus during the Year 1900. By A. E. Wright, M.D.Dub., Professor of Pathology, Army Medical School, Netley.— I am indebted to the kindness of Colonel W. J. Fawcett, R.A.M.C., Principal Medical Officer in Egypt, for the following statistics dealing with the incidence of enteric fever, and the mortality from the disease for the year 1900, in the inoculated and uninoculated, among the British troops in Egypt and Cyprus.

-	Average annual strength	Number of cases of enteric fever	Number of deaths from enteric fever	Percentage of cases calculated on average annual strength	Fercentage of deaths calculated on the same basis
Uninoculated	2669	68	10	2.5	0.4
Inoculated	720	1	1	0.14	0.14

These figures testify to a nineteen-fold reduction in the number of attacks of enteric fever and to a threefold reduction in the number of deaths from that disease among the inoculated.

In a note appended to the statistical table printed above, Colonel Fawcett observes that the measure of protection resulting from the inoculation is not fully disclosed by a comparison of the figures of cases and deaths given in the table. Owing to the circumstance that soldiers inoculated in previous years are in the statistics included among the uninoculated, the number of the uninoculated was in reality less, and the number of the inoculated was in reality greater, than the figures set down for these groups in the first column of the above table. The figures in the second and third columns, on the other hand, accurately represent the number of cases and deaths in the inoculated and uninoculated, inasmuch as none of those inoculated in previous years contracted enteric fever.

A further point adverted to by Colonel Fawcett is that the only case which occurred among the inoculated occurred in the case of a patient admitted to hospital on the thirty-third day after inoculation. It would seem that the disease was in this case contracted before anything in the nature of protection had been established by the inoculation.

#### YELLOW FEYER.

CASES ON BOARD H.M.S. "CONDOR."—We are informed by the Admiralty that the latest information regarding yellow fever on H.M.S. Condor, is to the effect that a telegram dated April 29 had been received from Esquimalt stating that the vessel arrived on that day and there was no yellow fever on board. Two cases had previously occurred and had been landed at Panama.

#### MISCELLANEOUS.

ANKYLOSTOMUM DUODENALE.—In a note on the prevalence of ankylostomum duodenale in the Darbhanga (Durbunga) district, Bengal, Dr. J. T. Calvert, Major I.M.S., states that an examination of the stool of each prisoner admitted to the district jail showed that the ova of the ankylostomum duodenale occurred in no less than 83 per cent. of the first hundred cases examined. The percentage of ova of other parasites present in the cases referred to was (1) ascuris lumbricoides, 39 per cent.; (2) tricocophalus dispar, 12 per cent.; (3) oxyuris vermicularis, 9 per cent. The ankylostomum was found also to be equally prevalent amongst the general population attending the dispensaries in Darbhanga, children as well as adults being affected. Captain Calvert remarks, that exactly how much sickness and mortality can be ascribed to this intestinal parasite, appears to be as yet impossible to determine. Ciliated infusoria were met with occasionally in the stools of patients being examined for parasites.

ELEPHANTIASIS OF THE SCROTUM.—The surgical technique and operative treatment of elephantiasis of the generative organs, based on a series of 140 consecutive cases. In the Indian Medical Gazette of March, 1901, Major R. Havelock Charles, I.M.S., Professor of Surgical and Descriptive Anatomy and Clinical Surgery, Calcutta, contributes a most valuable article on the surgical procedure requisite for the removal of elephantiasis of the generative organs. The best test of the success of Major Charles' method is to be found in the fact that all the cases treated, to the number of 140, recovered, and that in most an excellent covering to the generative organs was obtained. The article in question is really an exhaustive account of the operation, inasmuch as every detail of the procedure is dwelt upon and exactly described.

The patients operated upon varied from 16 to 62 years of age; and in many, hernial and other complications existed; and the fact that other parts of the body, such as the arms and legs, were implicated in the disease, did not prove a deterrent to the surgical treatment.

The principles enunciated by Major Charles are:—
(1) Careful general and local preparation; (2) asepsis;

(3) the lithotomy position during the operation; (4) the rubber cord as a means of arresting hæmorrhage is not regarded as necessary nor even expedient; (5) bleeding is prevented or arrested by torsion and clamp torsion and not by ligatures; (6) the penis is enucleated by a dorsal incision commencing at the pubis and carried to the preputial orifice; (7) the lateral incisions commence over the external abdominal rings and are carried, in sound tissue, backwards between the scrotum and thighs, to meet in front of the anus; (8) the cords and testicles are enucleated by incisions parallel to the course of the cords, and are made after, not before, the lateral cuts; (9) skin flaps from the inside of the thighs are brought to meet in the median line after the skin and subcutaneous tissues of the flaps are separated; the testicles are maintained in position in the pockets formed by the skin over the perineum; (10) the prepuce is stitched to the penile tissues; (11) the flaps are stitched to the penile tissues around the root of the organ; (12) the penis is dressed separately to the other parts of the wound, by being bandaged from point to root; (13) gauze, (perchloride or iodoform), in single filmy thicknesses, is applied by allowing it to fall from above downwards on the parts, covering them from near the umbilious well out on to the groin and as far back as the anus. The bandage around penis is stitched to the main dressing; (14) a roller bandage, composed of "bandage cloth," obtainable in Indian bazaars, is applied over all so as to maintain equable pressure. Calico bandages are not suitable.

The article is illustrated by excellent photographs. Elephantiasis in the female is also dealt with, and a tabular list of the numerous cases is appended.

How to Collect Mosquitoes and send them for Examination. A Request for the Collection and Sending of Mosquitoes. By Dr. C. Meuse.—The most recent discoveries as to the etiology of malaria and yellow fever have directed the attention of the medical world to the hosts of the originators of these illnesses—the mosquitoes. Observations on these insects from a systematic and biological standpoint promise to reveal much that is new, and may be of assistance in furthering the progress of hygiene and pathology.

We request readers and workers to direct their attention to the Culicida, and during their travels in malaria and yellow fever regions, to collect these insects, and if not able to examine the same themselves to send us the specimens. The transmission is very easy. The insects, caught with a short-handled gauze net, which can easily be carried in the pocket, are killed in a re-agency glass or glass bottle, by damping the wadding stopper slightly with benzine. Still easier is it to place them in a wide-necked bottle with a tightly fitting stopper, at the bottom of which there should be a piece of cyanide of potassium over which plaster of Paris, mixed with water, has been poured to fasten it down. Afterwards the insects are dried in the air and placed loose in a small cardboard pillbox, the inside of which has been lined with oiled paper. A great many mosquitoes can be packed and sent home in this way. But the most desirable way of preserving and sending the mosquitoes is in 75

degrees alcohol. But the glass bottles, tubes, &c., must be filled right up and hermetically sealed so that no bubbles of air find entrance, or evaporation takes place with consequent injury of the contents through movement. A few accompanying remarks respecting place, time, temperature, and the conditions of wind and weather at the place of capture will be very useful. The question as to where the insects are found, if in houses, tents, ships' cabins, railway carriages, &c., and where their breeding places are; if they avoid or frequent certain places, spaces, coverings of walls and floors; if they travel on ships or in trains, and under what conditions the insects show a tendency to fly and bite, are all points of important practical signification.

Even the smallest contribution will be welcomed by the Editor, who will have the same worked up, or will be pleased to help the sender with advice.

—Archiv. für Schiff's-und-Tropen-Hygiene, April,

1901.

A STRIKING confirmation of the malaria mosquito theory, substantiated by statistics, is given by Dr. Procaccini in the Annales di Medicina Navale, Nos. 11 and 12, 1900, in an article entitled "Ricerche profilattiche contro la malaria instituite sulla Costa Sarda." On the coast of Palau on the North of Sardinia, where there is a garrison consisting on an average of from 90 to 130 men, the statistics of attacks of malaria from 1895 to November 1, 1900, are as follows: -1895, 700 cases; 1896, 583 cases; 1897, 348 cases; 1898, 394 cases; 1899, 571 cases; 1900, 107 cases. The author realising the gravity of these numbers amongst a small population, tried various methods to keep the mosquitoes at bay. Of 104 persons who placed themselves at the disposal of Dr. Procaccini for this purpose, only one had malaria, and this was owing to the individual not having taken the precautions required. The methods adopted for keeping off the mosquitoes were simple to a degree, consisting only of the use of mosquito nets and the wearing of suitable caps, gloves and clothes.

EXPERIMENTAL INOCULATION OF MALARIAL FEVER IN NAGPUR.—Dr. Andrew Buchanan, Major I.M.S., in the *Indian Medical Gazette* of April, 1901, contributes an excellent article on this subject in which he gives details of experiments in malarial inoculation by mosquitoes. His experiments confirm the belief that mosquitoes are active agents in the spread of malaria. In the course of his article a number of important points are discussed.

(a) Four kinds of malarial fever are found in Nagpur, viz., quotidian, benign tertian, quartan and malignant tertian; the unpigmented quotidian

has not been met with in Nagpur.

(b) In untreated cases of malignant tertian, the temperature chart shows frequently three fairly distinct periods: (1) a tertian fever with gradually lessening paroxysms; (2) an interval of four to five days when fever is absent or very slight, during which period crescents will be found in the blood; (3) the flagellar or secondary fever, at which stage flagella will be found in the abstracted blood.

(c) Major Buchanan is of opinion that the second-

Treatment.

ary or flagellar fever may be possibly due to exflagellation occurring in the blood inside the body.

(d) Number of Culex eggs. In a tank almost two feet square there were, during the month of December, 1900, collected some 17,000 egg boats, which reckoning at the rate of 250 eggs per boat brings the number of eggs to over  $4\frac{1}{2}$  millions.

(e) Preserving Anopheles. A small quantity of mud placed in the bottom of the glass tumblers in which mosquitoes are kept serves to give the insects a resting place, and thereby lengthens their period of life. The larvæ of the mosquitoes feed readily on the pollen of grass seeds when it is shaken off in their cages.

(f) The colour of clothing attracts or repels nopheles. The men engaged in collecting mos-Anopheles. quitoes find that Anopheles hide themselves in their clothing when its colour is black, but that the insects avoid men with white coats.

#### Letters, Communications, &c., have been received from:

B.—Dr. W. J. Boase (Berbice).

C.—Dr. Carpenter (Cyprus); Staff. Surg. J. E. Coad, R.N. (Bermuda); Dr. J. Cran (Belize). D.—Mr. A. B. Duprey (Grenada); Rev. R. J. Dye, M.D.

(Haut Congo).

E .- Dr. M. D. Eder (Palmira); Dr. Alex. Edington (Grahamstown).

G .- Dr. David Galloway (Singapore).

H.-Capt. C. B. Harrison, I.M.S. (Madras).

J.—Dr. H. Noble Joynt (Fiji).

K.—Dr. W. E. de Korte (Cape Colony). M.—Dr. P. Manson, C.M.G. (London).

N.-Dr. F. Neal (Demerara); Dr. Chas. Neill (Nuddea).

O.—Dr. Ozzard (Brit. Guiana).
P.—Dr. J. W. Plaxton (Jamaica); Dr. H. Campbell Perkins (Travancore).

Perkins (Travancore).

R.—Dr. R. Ross (Liverpool).

S.—Miss S. H. Smith (Lucknow); Dr. E. J. Stubbert (New York); Rev. James Sandilands (New Hebrides).

T.—Mr. F. V. Theobald (Wye); Rev. G. R. Turner, M.B. (Amoy); Dr. J. C. Thomson (Hong Kong).

W.—Lt. Col. Whitehead, R.A.M.C. (Punjab).

## EXCHANGES.

Annali di Medicina Navale.

Archiv für Schiffs u. Tropen Hygiene.

Archives de Medicine Navale.

Archives Russes de Pathologie, de Medec., Clinique et de Bacteriologie.

Australasian Medical Gazette.

Boletin de Medicina Naval.

Boston Medical and Surgical Journal.

Bristol Medico-Chirurgical Journal.

British and Colonial Druggist.

British Journal of Dermatology

British Medical Journal. Brooklyn Medical Journal.

Climate.

Clinical Journal.

Clinical Review.

Giornale Medico del R. Exercito.

Hongkong Telegraph. Il Policlinico. Indian Engineering. Indian Medical Gazette: Indian Medical Record. Journal of Balneology and Climatology. Journal of Laryngology and Otology. Journal of the American Medical Association. La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal. Medical Brief. Medical Missionary Journal. Medical Record. Merck's Archives. New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyclinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo. The Hospital. The Medical and Surgical Review of Reviews.

The Northumberland and Durham Medical Journal.

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  - 2.—Manuscripts sent in cannot be returned.
- 3.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
- 4.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.
- 5.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Editors.
- 6.—Correspondents should look for replies under the heading "Answers to Correspondents."

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## Original Communications.

# NOTES ON THE DISEASES MET WITH IN UGANDA, CENTRAL AFRICA.

By Albert R. Cook, B.A.Camb., M.B., B.Sc.Lond. *Medical Missionary*.

The following remarks are based on observations made on 1,500 in-patients admitted to the Church Missionary Society's Hospital at Mengo, between May, 1897, and March, 1901, and on some 40,000 out-patients.

The British Protectorate of Uganda is a very hilly country intersected by the Equator and lying immediately to the north of that immense body of fresh water, the Victoria Nyanza Lake, with its area of over 20,000 square miles. The country lies at a mean elevation of over 4,000 feet above sealevel, and most of it consists of a countless number of hills and ridges separated by swamps densely packed with papyrus. There are but few rapid rivers. The climate is cool for Equatorial Africa, the temperature in the shade seldom rising above 80 degrees F. There are two wet seasons, the first commencing about the middle of March, the second about the middle of September, and both lasting some three months. Rain falls as a rule all the year round, i.e., even in the dry season a month seldom passes without some good showers. staple food of the natives, the Baganda, is either steamed or mashed plantains or sweet potatoes. A good deal of fermented banana wine is drunk.

The natives themselves are very intelligent, clean, and splendidly developed physically. They live in thatched houses scattered about their banana plantations. The soil is either red clay or igneous rock.

After these preliminary observations, let me proceed to an analysis of the 1,500 in-patient cases. Of these 779 or 52 per cent. were medical; 585 or 39 per cent. were surgical; 136 or 9 per cent. were gynæcological or obstetric.

The following table shows the occurrence of the chief forms of disease met with:—

Total admissions.

				10	bal a	amissions
Cases of malarial fe	ver		367,	forming	241	per cent
Venereal diseases (i	nelud	ing			•	
cases of strictu				,,	10	,,
Cases of stricture			47,	,,	3	,,
Diseases of digestiv	e sys	tem	74.		5	,,
Diseases of lung (e	xclud	ing				177
phthisis)			71,	,,	5	,,
Tubercular diseases	(incl	ud-				330
ing phthisis)			58,	,,	4	,,
Diseases of the eye			56,	,,	4	,,
Cardiac diseases			46,	,,	3	,,
Diseases of the	nerv	ous		"		
system			44,	,,	3	,,
Pneumonia			26,		11	
Ascites			25,		13	,,
				,,	1½ 1½ ·6	,,

Fever is exceedingly common, both natives and Europeans suffer severely from it. The hospital is built on the side of a splendid hill, the building being 150 feet above a well-drained swamp at the bottom. The mission station is also built on the same hill. The missionaries, though usually free from fever, are by no means exempt. One case of blackwater fever occurred among them last year. The same fell disease has broken out several times on the adjacent hill of Rubaga, the headquarters of the Roman Catholic Mission, and on the two Government hills of Kampala and Nakasero. This disease seems to be increasing in frequency, though as yet not common. I have seen some twelve cases in the last four years—two being among natives. The variety of malarial fever which predominates almost to the exclusion of other varieties is the socalled æstivo-autumnal form. As we might a priori expect from this fact, the death-rate is very high. I should like to emphasise this fact because, before leaving England, I was given to understand that natives suffered very slightly from malaria, and the death-rate amongst them from this cause was slight. Whatever may be the facts in other parts of Africa, the very opposite holds good in Uganda. I find that during the four years we admitted 367 cases of fever,

of whom 46 died, a death-rate of over 12 per cent. Of course many of these were brought in in a desperate condition. The plasmodia may easily be detected by the excellent methylene-blue method recommended in Manson's "Tropical Diseases." tended use of this method has impressed its value upon me. In over 140 consecutive cases of malarial fever from a clinical point of view, I have found the plasmodium in every one. The parasites are not easy to detect in a fresh specimen of blood, and, with  $\frac{1}{12}$  oil imm. and No. 3 eye-piece, need very careful looking for. The reason of this is that they are frequently non-pigmented, at any rate in the peripheral circulation. The so-called "malignant" forms of fever are common. Quinine given hypodermically seems the best remedy. Many cases display a somewhat protracted obstinacy in yielding to quinine, though eventually it wins the day. Malarial cachexia with profound anæmia and enlarged spleen is all too sadly common.

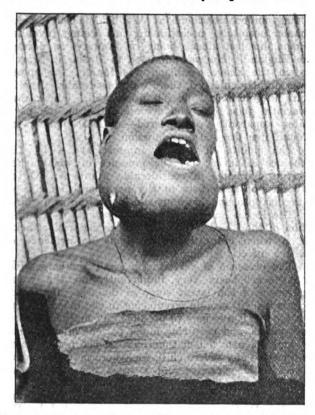
The invasion of fever is frequently heralded by smart diarrhea. As a broad rule rigors and shivering are very poorly marked. The malarial ulcers described in a recent number of the JOURNAL OF TROPICAL MEDICINE are very rare, though large ulcers are met with in natives debilitated from the effects of prolonged fever. I hope to contribute a subsequent article to this Journal on malaria as met with here, so I will not enlarge on the subject except to say that Anopheles is probably very widely dis-

tributed.

Venereal diseases may be very shortly dismissed. Syphilis is rampant everywhere, and is of course spread by many other channels than venereal ones, e.g., passing pipes from one to the other, &c., &c. Stricture is very common, and the patients usually apply at the last stage, or when extravasation or even gangrene has set in. We do numerous Wheelhouse operations and find them very satisfactory. Thanks to the wonderful constitution of the natives, even extensive gangrene of scrotum and penis by no means proves fatal, the affected parts sloughing off. The specific infectious diseases met with are the following: -Smallpox, which is very deadly, slaying its hundreds. We have vaccinated several thousands of people, and they much appreciate the safety Chicken-pox is very common. fever, concerning which information was asked for in this Journal, I have never met with, nor strange to say, typhoid fever. It must be remembered, when I landed at the coast in 1896, it was a three months' journey by caravan to the Lake, and so sick cases would be weeded out. Doubtless with the advent of the railway this scourge of civilisation will make its presence felt. Measles are very common, and many infants die of subsequent broncho-pneumonia, their unclothed bodies being but poorly fitted to withstand the evil effects of chill. Mumps is very common. An epidemic is now raging; we had nine cases from one household. A boy came up with typical metastatic orchitis. Whooping-cough is common. I have not met with dengue, cerebro-spinal meningitis, or diphtheria, though I remember one case curiously like the latter. It was in a child who had sore

throat and enlarged cervical glands followed by squint, but subsequently retraction of the head and a continual screaming cry set in. It was probably a case of tubercular meningitis. No post mortem was obtained, as she made a perfect recovery. Erysipelas and pyæmia are met with, but I have not seen a case of cholera, yellow fever, anthrax, or hydrophobia. Bubonic plague is endemic, and often mild sporadic cases occur. From time to time epidemics sweep over parts of the country and kill hundreds. Thus it was very rampant in and around the capital after the wars of 1889 and 1890. A sharp epidemic occurred in Buddu about 1896, and more recently it was carried by native traders to some of the islands of the lake. In the village of Kitengule, close to the southern border of the Protectorate, it killed off about 75 per cent. of the The German doctors who investigated inhabitants. the outbreak and made post mortems discovered the typical bacillus. I have only had six cases in the hospital, they were all admitted within eight days, during May, 1899, and all recovered, although three were desperately ill. Dysentery is frequent, but of the mild catarrhal type; we find magnesium sulphate most efficacious. I have had three cases of tetanus under my care. Two occurred in men with bullet wounds; two proved fatal; his friends took away the other just when he seemed recovering, and I could not hear what became of him. Tubercular diseases are common; phthisis, tubercular joints, caries of the spine, psoas abscess, scrofulo-derma, tubercular glands, &c. They accounted for 71 (5 per cent.) out of the 1,500 enumerated above. The phthisis is very chronic, probably owing largely to the openair life these people lead. I never saw a case of "galloping consumption." Leprosy is said to be common in Bunyoro (N. Uganda); I have only seen a very few cases here. Rheumatic fever and arthritis deformans are both met with, the former reacting typically to sodium salicylates and presenting the usual fugaceous effusions into joints. In this connection it may be mentioned that cardiac organic disease is common. Gout must be very rare, I have not seen a case. It must be remembered that the bulk of the people can very seldom obtain any meat. Diabetes is rather uncommon and very fatal, but we had one remarkable case of apparently permanent cure. Rickets is never seen, the children are often suckled up to 15 months or even 18 months. The Baganda have a curious idiosyncrasy towards mercury, even small doses of this drug giving rise to severe salivation. Thus 5 grains of calomel is almost sure to cause ptyalism, even the 1 grain contained in a single Livingstone Rouser may set up a somewhat severe stomatitis. A native boy to whom a European once unwittingly gave 10 grs. of calomel came to the hospital suffering from severe hæmorrhage from a terribly ulcerated mouth; he nearly died. Pharyngitis and adenoids are common. The teeth are splendid as a rule, yet we have extracted over 300 in the past three and a half years. The various forms of dyspepsia, diarrhœa, appendicitis, and hernize are met with much as at home. We have only seen one case of intussusception in a man. Malignant disease is common-sarcoma of the

jaws, upper and lower, is perhaps the most frequent form. I enclose a photograph taken by the Rev. R. H. Leakey for me of a native princess in Koki suffering from sarcoma of the lower jaw. She died about ten months after the photograph was taken. Carcinoma of the œsophagus, colloid cancer of the ascending colon, carcinoma of the uterus, squamous epithelioma of the cervix, epithelioma of the penis and of the lip, and melanotic sarcoma of the hand, and a melanotic cyst of the right serratus magnus muscle, are some of the forms met with; also chondro-sarcoma of the parotid region and scirrhus of the breast. Malignant diseases are, however, not nearly as frequent as they are at home, and appear to run a slower course. Thus a young man whom



I operated on early in 1897, removing a chondrosarcoma of the neck, the tumour being  $10\frac{1}{2}$  inches round, is still alive (March, 1901) and able to do a long day's work, though the tumour has grown to a great size, and lately he has some hæmoptysis and dysenteric stools.

We have had over 150 cases of bullet-wounds to deal with, including compound comminuted fractures of almost every bone in the body. These cases, if not killed outright by shock or hæmorrhage, nearly always recovered. Catarrhal jaundice and jaundice complicating fever are not rare. Gall-stones I have never seen. Ascites due to hepatic, cardiac, malarial and tubercular (tubercular peritonitis) affections are common; huge malarial spleens prevail; Bronchitis, phthisis, and pneumonia are common. Of the latter we admitted twenty-six cases of which eight died—a mortality of over 30 per cent. Here,

again, they brought us several cases almost in One developed meningitis. extremis. pleurisy is common, pleurisy with effusion is rare. I only met with one case of empyema due to a spear wound. One case of malignant disease was associated with hæmothorax. Valvular diseases of the heart are common. I only remember one case of pericarditis with effusion verified by post mortem. Atheroma and aneurisms are very rare, though syphiltic endarteritis obliterans is probably common. Nephritis may be taken in this connecton. It is distinctly rare except as a complication of malarial fever. Only ten cases out of the 1,500 were nephritic. Here, again, the vegetable diet of the people must be remembered. High tension pulses are not often met with.

Goitres are common; albinoes are not very un-

Amongst women ovarian tumours are met with, fibromata of uterus are very common, and retroflexions of uterus. Stone in the bladder is practically unknown. I have twice met with a phosphatic stone impacted in the urethra, and one of these cases was in an Indian. As regards diseases of the nervous system, neuritis, especially postmalarial, is met with and facial paralysis. Myelitis, paraplegia, infantile paralysis are not uncommon. In spite of the almost universal spread of syphilis I have never met with a case of locomotor ataxy or general paralysis of the insane. Spastic paraplegia is met with, but progressive muscular atrophy has not been noticed. Sciatica is met with. In one obstinate case stretching the nerve produced a permanent cure. Hemiplegia is frequent, and found in connection with kidney disease, embolism, and also with syphilitic disease of the arteries, and as a sequela of malaria. In both the latter classes recovery seems not infrequently to take place. I have seen several cases of meningitis, one of chronic hydrocephalus and none of multiple sclerosis. Epilepsy is very common; the natives have a great horror of it and think it contagious. Hysteria is not very rare. Chorea is met with, and paralysis agitans. I have seen one case of convulsive tic. Neuralgia, specially malarial, is common. Malarial eye-affections are common, total blindness sometimes supervening from severe retinitis or choroiditis. Cataracts are common and occur at all ages. Corneal ulcers are very common, and phlyctenular Trachoma is exceedingly common conjunctivitis. in pure-blooded natives, a point worth remembering in connection with the discussions on this point. Sunstroke is very rare. Dementia and mania are the commonest forms of insanity met with; the former often follows severe fever. Suicide is frequent, often for what we should call very trivial causes, e.g., inability to pay tribute, discovery of theft, &c. Flat foot is met with, but scoliosis and kyphosis are rare. Innocent tumours are common, lipoma, fibromata, nævus, enchondroma, osteoma, sebaceous and dermoid cysts. Skin diseases show a rich profusion, but eczema, save for the specific form, is rare; so is psoriasis. The parasitic forms flourish—ringworm of the body, scabies, impetigo, &c. We have had three cases of pemphigus, two of whom

climates.

died. Of the more especial tropical diseases not mentioned above, I have not met with beri-beri. Sleeping sickness is said to be common in Busoga, to the east of Uganda. We have only had two cases admitted into the hospital. In both of these I easily found filaria perstans; one died, and a post mortem showed nothing very characteristic. The pituitary body was large, but not, I think, pathologically so. I have only once seen hepatic abscess in a Muganda. It is common among the Nubians. Dr. Moffat, P.M.O., of the Government Medical Service, tells me he frequently sees yaws amongst the Nubians, &c., but though I have been on the look out for it, I have not seen an undoubted case amongst the Baganda. We have had one case of oriental sores. Elephantiasis is very common, I have met with two cases of filaria diurna, and three of filaria perstans, and one of filaria medinensis. Jiggers (chiggers) are universal; they only appeared in this country in 1891 having apparently been carried across Africa by Stanley's last expedition. This expedition did not actually enter Uganda, but many Baganda who had been driven out of their country by a revolution met with Stanley's expedition and brought back the jiggers to Uganda. Coming up country in 1896 we met the jiggers just before we got to Machakos. Following the caravan route they slowly made their way down to the coast, which they reached about 1899. Till the natives realised their nature they did great damage and caused the loss of many toes, &c. Now the natives take far better care of themselves and so suffer less. Climatic bubo is common; I have seen two cases of goundou and one typical case of ainhum.

In conclusion, I should like to bear my testimony to the great usefulness of the Journal of Tropical Medicine. When I left England in 1896 I had only Davidson's "Tropical Diseases," and hailed the publication of the above-mentioned Journal with great pleasure; I think it admirably fulfils its work of helping the isolated medical man in tropical

A CASE OF TERTIAN BENIGN WITHOUT FEVER, WITH REMARKS ON THE "PERIOD OF LATENCY" IN MALARIA.

By Staff-Surgeon P. W. BASSETT-SMITH, R.N.

Lecturer on Tropical Diseases, Haslar. (Published by kind permission of the Medical Director-General.)

In the treatment of malarial disease, the medical officer, frequently in the tropics, less frequently at home, comes across cases which present anomalous conditions. We now know that many of those peculiar fevers so common in hot climates, which used generally to be classed as malarial, are not due to the malarial parasite at all, and one also occasionally meets with cases where the parasites are present in the blood, yet there is no fever (apart from the algid forms of pernicious attacks), which Manson believes is either due to the presence of only a minimum number circulating in the blood, not numerous enough to give rise to sufficient toxin to cause fever, or to the gradually produced im-

munity of the subjects. Lately we have had in the R.N. Hospital at Haslar an interesting case in which the patient is stated not to have had any fever for over a month, and during the time in Haslar, though the temperature was taken every two hours, it did not rise above 98.8, but whose blood showed at first quite a considerable number of well-marked tertian benign parasites of different ages for several consecutive days. These were traced from the early active, non-pigmented, amœboid condition to parasites completely filling the enlarged dition to parasites completely many corpuscle, and containing an abundance of fine pigment, but no sporocysts were ever detected. original disease was probably contracted at Colombo in June, 1900. From that time he suffered from repeated attacks of "ague" on the China station, being under treatment at Wei-hei-Wei and Yokahama hospitals, necessitating his being invalided home, his last attack being in January, on passage to England. He was admitted to Haslar in March, when the above condition was found; the spleen was slightly enlarged, there was considerable anæmia, but he stated that he felt quite well. Under rest, warmth, good diet, and arsenic and iron, the parasites apparently disappeared—at least none were found five days after admission.

The points of special interest are:—(1) The absence of fever; (2) the presence of well-marked tertian parasites in considerable numbers; (3) the absence of sporocysts in the peripheral blood; (4) the disappearance without administration of quinine.

The lesson one learns is that systematic examination of the blood is necessary after malarial attacks, even when clinically there seems no evidence of active infection being present.

The presence of parasites in small numbers, without fever, bears very importantly on the vexed question of the latent stage of malaria; for if the parasites still remain circulating in the blood, though in too small numbers to produce any marked clinical symptoms, and requiring much patient microscopical examination to detect them, yet on the person being subject to any severe chill, &c., there may be a great increase of parasites and a fresh paroxysm occur, the patient having thought himself cured.

The theory of apparent cure is ably put forward by Dr. D. Gray, in a paper communicated by Dr. C. W. Daniels to the Journal of Tropical Medicine,\* in which he draws attention to the protracted periods during which the parasites appear to be latent, and points out that for the "period of latency" all that is necessary is that the natural check to the multiplication of the parasite should be sufficient to keep them in small numbers only; and he also states, "one parasite per c.m. would probably escape detection with careful examination, yet with that number there would be some millions in the total blood."

Major R. Ross, F.R.S., also holds this view with regard to the periods of latency.

Dr. Moffat, C.M.G., of Uganda, + says: "I have long held the view that probably a certain number

<sup>\* &</sup>quot;A Case of Quartan showing Cyclic Variation of Parasites," April 1, 1901.

<sup>+</sup> Journal of Tropical Medicine, March 15, 1901.

of parasites are necessary in each case for the production of a manifest malarial attack. If the parasites are not sufficiently numerous no actual attack will occur, but the patient nevertheless suffers a certain amount of injury." Whether this condition of apparent cure may apply to those cases which after many months relapse, is a point which requires further elucidation.

The karyochromatophilic granules, or primitive forms of Plehn, as a source of latency have not yet

been satisfactorily confirmed.

It is interesting to note that quinine, although it cures the fever, does not always entirely kill off all the parasites even in benign infections, for the above patient had taken the drug fairly constantly while in China and on the way home. This is a point of some importance.

#### RELAPSING FEVER IN SUMATRA.

By J. C. GRAHAM, M.D. Deli, Sumatra.

The occurrence of a case of relapsing fever on the east coast of Sumatra is an important event in the history of disease. It is the first case ever recorded here, and was imported on the 10th of this month by an immigrant Chinese coolie from Swatow. The man had high fever, tenderness over both hypochondria, pains in his joints and the muscles of the leg, besides severe headache. The ocular conjunctivæ and the skin generally were icteric. Not suspecting relapsing fever, I examined the blood for malarial parasites, using Romanowski's double stain. There were no malarial parasites, but the specimen teemed with spirilla Obermeieri.

The course of the fever was not influenced by quinine in 1·3 gramme doses daily; but subsided to 35·6 degrees C. on the sixth day, to become normal the day after. I am now treating him with iodide of potash empirically, on the supposition that, as this substance is said to arrest the virulence of the spirillum in inoculations, it may have an in-

hibitory action on the return of the fever.

QUININE PROPHYLAXIS.—"I am still of opinion that the best prophylaxis is the daily use of a small dose of quinine (3 to 5 grains) throughout the summer (May to November), but I am very sceptical as to whether it will ever be possible to persuade the bulk of the population to adopt this course. I certainly think the better educated amongst the community might in this instance do worse than follow medical advice, though possibly they will prefer to go on expecting Government to kill off all the mosquitoes regardless of cost, which idea seems at present to have taken hold of most. I may say that this course of treatment does not prove in any way injurious."—Dr. Bell, Hong Kong Civil Hospital Report, 1901.

MALARIA IN A CHILD OF THREE WEEKS. By J. C. Josephson, M.D., Baltimore, Md.—Baby Rosenfeld became ill when a week old. His mother had lived in a malarial district in the South, and had had several attacks, the last one on the eighth puerperal day. Ever since then the child had been ailing. Every afternoon, about three or four o'clock, he would become blue and have a slight spasm. Then he would have a fever. He was very restless, took the breast badly, was pale and small, and had a very marasmic look. In the morning there would be no fever. I first saw him about the twelfth day of his illness on November 30, 1900, in one of his typical attacks. The child was pale and bluish, and had a slight spasm of the muscles of the face. The breathing was jerky. The temperature was 102 degrees F. The spleen was much enlarged. He had been treated for consumption since he first became ill, by a certain ignorant but very popular practitioner, one of those "years-of-practice" men that we have here. There was absolutely nothing abnormal in the chest. The regular periodicity of the attacks, the mother's history, and the enlarged spleen convinced me that I had to do with a case of malaria, and five days' dosing with quinine—at first 4 grains a day and later 2 grains—cured the child entirely, and he has been flourishing ever since.-Medical Record, April 20, 1901.

The Treatment of Mosquito Bites.—M. Manquat expresses his opinion that tincture of iodine and formaldehyde are the most useful drugs, while the usefulness of menthol should not be overlooked. According to M. Manquat, tincture of iodine applied at once after the mosquito has bitten causes the abortion of the symptoms in a period varying from ten to twenty minutes. For the face, wrists, ankles, and other delicate cutaneous surfaces, the following formula should be applied:—

R Formaldehyde, 40 per cent. . . . 5 parts
Alcohol
Water
of each . . . . 10 ,,

It should not, however, be left on long, but should be repeated lightly and not to such a degree as to cause irritation or smarting. Another application, useful for slight insect bites, is 4 or 5 per cent. menthol in eau de Cologne.—Bulletin Général de Thérapeutique, November 15, 1900; and Archives de Médecin et de Pharmacie Militaires, April, 1901.

The Administration of Quinine.—It may be quite safely held that any intermittent fever that resists quinine, properly given, for three or four days, is not due to malarial infection. In an ordinary case of intermittent fever the average dose of the drug may be 10 grains, preferably given when the sweating stage begins. Subsequent to this 5 grains should be given three times daily for a week or more, and at intervals of several days thereafter two or three doses a day may well be used. It is generally better to use a soluble salt, in solution, or perhaps the common sulphate in capsules, than to depend upon pills, granules or tablets.—Clinical Review, May, 1901.

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## Journal of Tropical Medicine

JUNE 1, 1901.

DO ADENOIDS (NASO - PHARYNGEAL) OCCUR IN NATIVES OF TROPICAL COUNTRIES?

This is a question which is frequently asked of medical men returning from tropical countries by Laryngologists and others in Britain.

The question was put some years ago now by a Danish physician and answered by a few observers in the affirmative. All, however, seem to agree that adenoids are much more rare in warm climates than in the more temperate regions. Whether these statements can be regarded as scientifically correct or not remains to be proved, and we are asking the question at the request of several men interested in laryngology. Photographs of cases would be welcomed, and we hope that a general reply to this query will elicit information from many sources. There are two or three headings under which replies may be classed.

First, are the children of natives liable to naso-pharyngeal adenoids? if so, is the ailment (a) common; (b) rare; (c) or fairly prevalent? Second, are the children of Europeon parents residing in the tropics liable in any degree to adenoids? Third, are persons of mixed (European and native) parentage more, less, or equally liable to adenoids with either the European or native? The etiology of adenoid growths in the pharynx is at present undecided, and many questions arise in connection with the ailment. Has it a racial, a climatic, or a hereditary basis of origin? Is its frequency determined by the scale of civilisation? Is it a disease of recent origin dependent upon modern modes of living? All these and many more questions attach themselves to the subject, and some of them at least might be answered by ascertaining in some degree, at all events, a knowledge of the geographical distribution of the complaint.

## THE LADY MACGREGOR PRIZE.

WE have to cordially thank Lady Macgregor for her liberality in bestowing a prize of £10 to be competed for by medical men resident in malarial countries. The subject Lady Macgregor has chosen for the prize is "The best Method of the Administration of Quinine as a Preventive of Malarial Fever." The eminently useful and practical end to be attained by an elucidation of this subject will commend itself to every one, and we hope to gather a store of knowledge from competitors in many regions. It is a matter upon which most practitioners must have an opinion one way or another, and therefore the competition may be truly said to be an open one. The letter announcing the subject of the prize is dated from Government House, Lagos, West Africa, a fact which clearly indicates the personal interest Lady Macgregor takes in the work of her distinguished husband. No man is more conversant with the requirements of the tropics from a medical and sanitary standpoint than the present Governor of Lagos, and the selection of

the subject for the prize by Lady Macgregor adds another to the many debts residents in the tropics, and medical men in particular, owe to Sir William and Lady Macgregor. The best way of acknowledging Lady Macgregor's liberality and her concern for the dwellers in warm climates, whether European or Native, will be by as many as possible sending in their opinions and experiences on the subject she has wisely chosen to be elucidated.

## THE POLYCLINIC FESTIVAL DINNER.

MR. BALFOUR ON MEDICAL SCIENCE.

At the Festival Dinner of the Post-Graduate College and Polyclinic, held on May 22, 1901, at the Hotel Cecil, The Right Hon. A. J. Balfour, M.P., presiding, a large and influential gathering testified to the importance of post-graduate work for medical men. Close upon 500 guests sat down to dinner, and the galleries were filled and enlivened by the presence of a number of ladies

The Polyclinic, although it has only completed the second year of its existence, has become an essential feature of medical education, and its continuance and success is assured. Medical practitioners who are in earnest, and who do not wish to fall behind in the race and competition of life, must avail themselves of the instruction the Polyclinic affords. Medical men from the more distant parts of the empire, and foreign medical men, find in the Polyclinic what may be best described as a Club for Medical Instruction; for whilst the building affords some of the conveniences of a club, the clinics and selected lectures are of a kind to convey the instruction to medical practitioners in the manner and method acceptable to their requirements.

The attendance at the Polyelinic of some fifty to eighty busy practitioners from four to five o'clock every afternoon testifies to the desire for knowledge of the post-graduate, and to the excellence of the teachers and teaching.

Supporting the Right Hon. Arthur J. Balfour, M.P., LL.D., chairman, on the right were His Grace the Duke of Marlborough, P.C.; the Right Hon. Lord Kelvin, LL.D., F.R.S.; the Right Hon. Lord Strathcona and Mount Royal, G.C.M.G.; Jonathan Hutchinson, Esq., LL.D., F.R.S.; W. Knox D'Arcy, Esq.; A. Bence Jones, Esq.; Sir John A. Cockburn, K.C.M.G., M.D.; Sir James Crichton-Browne, LL.D., F.R.S.; Sir Albert K. Rollit, M.P., LL.D.; Sir Henry Burdett, K.C.B.; Mr. Sheriff Lawrence, M.P.; Sir William R. Gowers, F.R.S.; Timothy Holmes, Esq.; Professor Clifford Allbutt, LL.D., F.R.S.; the Hon. Alfred Lyttleton, K.C., M.P.; His Honour Judge Sir Lucius Selfe; Dr. Bowles; the Rev. Canon Ainger; M. A. Goldschmidt, Esq.; Dr. Stephen Mackenzie; Vice-Admiral G. Morant; Dr. Patrick Manson, C.M.G., F.R.S.; Sir T. Lauder Brunton, LL.D., M.D.; Dr. Wallace, and Dr. James F. Goodhart. To his left

were Sir W. H. Broadbent, Bart., K.C.V.O., F.R.S.; the Right Rev. the Lord Bishop of London; the Right Hon. Lord Balfour of Burleigh, K.T.; the Right Hon. the Lord Mayor; Alderman Thomas Crosby, M.D.; Sir Joseph Fayrer, Bart., K.C.S.I., F.R.S.; Sir Walter Foster, M.P., M.D., LL.D.; Admiral Sir Richard Tracey, K.C.B.; Sir John Batty Tuke, M.P., M.D.; Sir Robert M. Craven, F.R.C.S.; Surgeon-General Harvey, C.B., I.M.S.; the Ven. Archdeacon of London; Professor Ray Lankester, LL.D.; C. Rube, Esq.; Sir Alfred Swayne Lethbridge, K.C.S.I.; Sir James Blyth, Bart.; Malcolm Morris, Esq.; Alfred Beit, Esq.; E. Paris Singer, Esq.; Sir Sydney Sheppard, K.C.M.G.; Lionel Phillips, Esq., and Dr. Alfred P. Hillier.

Presiding at the several tables were Dr. Fletcher Little, supported by Benjamin A. Lyon, Esq., Edward Atkin, Esq., and Surg. Lt.-Col. Oswald Baker. Dr. St. Clair Thompson, supported by Dr. Douglas Kerr, Colonel Alfred Clarke, R.A.M.C., Insp.-Gen. Alex. Turnbull, T. R. Jessop, Esq., and Dr. H. Radcliffe Crocker. James Cantlie, Esq., supported by Sir William Robinson, G.C.M.G., Sir Arthur Trendell, K.C.M.G., the Hon. E. R. Belilios, C.M.G., N. J. Ede, Esq., T. Pridgin Teale, Esq., and Lieut.-Col. Probyn, L.C.C. Dr. Theodore Williams, supported by Lieut.-Col. C. M. McCartie, M.D., Dr. A. L. Galabin, George Cowell, Esq., Dr. A. Macfadyen and Johnson Smith, Esq. Dr. Guthrie Rankin, supported by the Hon. R. H. Lyttleton, Lieut.-Col. Babtie, V.C., C.M.G., S. Loewe, Esq., Dr. D. M. Maclehose, and Surg.-Gen. W. B. Beatson. Capt. A. E. Hayward Pinch, F.R.C.S., supported by Edward Treacher Collins, Esq., Dr. Dawson Williams, William Watson Cheyne, Esq., and Morgan Finucane, Esq. Dr. Seymour Taylor, supported by Sir Thomas Roe, M.P., W. Francis Roe, Esq., Cecil Harmsworth, Esq., H. E. Juler, Esq., Dr. Isambard Owen, John Tweedy, Esq., and Dr. J. Burney Yeo. Sir William Kynsey, K.C.M.G., F.R.C.P., supported by Lieut.-Col. W. H. Thornhill and Dr. J. Mitchell Bruce. Dr. William Cubitt Lucey, supported by Dr. Boyd Joll and Frederic Eve, Esq.

In proposing the toast of "The Polyclinic," Mr. Balfour said:—

It is now my duty to propose the toast of the evening, and I can assure you that I do it with deeper feelings of responsibility than, I think, usually oppress a person in my position, because I know that I am pleading a cause which has not behind it any great wave of popular feeling or emotion, a cause which does not readily or immediately appeal to the man in the street, and yet a cause in which the whole community are deeply and profoundly interested; a cause which touches every one of us human beings, and will affect not only our own happiness, our own lives, and the happiness and the lives of those nearest and dearest to us, but the future generations whom it is our business to aid. The toast I have to propose, as you will know, is that of "The Polyclinic." Polyclinic is in this country as yet a young institution, though well known and fully recognised in almost every other civilised country in the world.

#### THE AIMS OF THE POLYCLINIC.

It is an institution with many sides of utility and activity. I will not attempt to dwell upon them all, but there are three which especially appeal to me and which, I venture to think, will especially appeal to you when I attempt to describe them and to tell you in what their chief characteristics consist. The first side of the activity of this institution may be described, perhaps, as directly philanthropic—that is to say, it brings directly home to those men in need of it, and to those who could not otherwise afford it, medical assistance, medical advice, and medical knowledge which would not under other circumstances be at their command. The Polyclinic does something which the great hospitals of this country could not do and do not attempt to do. There are vast sections of our population who can avail themselves and do avail themselves of the services of the general practitioner but who, in cases of extreme difficulty when their medical attendant would, were they persons of means, recommend them to go to some expert consulting physician, have not the resources which would enable them to take that course. This is a want not supplied by our hospitals, which cannot be supplied by our hospitals under their existing organisation in any large measure; it is supplied by the Polyclinic. The Polyclinic does give, and hopes to give in everincreasing measure, to the class of which I speak that expert medical advice which at present is at the command only of the well-to-do. I cannot imagine a charity, in the ordinary sense of the word, which ought more to command the generous support of those who are able to give it. And yet I venture to think that what I may describe as the directly charitable or philanthropic side of this institution is not its most important side. It is not the form of its activity which I think will produce the most far-reaching benefits to mankind, for, in addition to this consultative expert medical opinion which it is ready to afford to those who could not otherwise obtain it, the Polyclinic is designed to give opportunities of medical education to those who have, indeed, qualified as medical students, who have gone through the ordinary courses which qualify a man to practice, who are, perhaps, in a great, and deservedly great, practice, but who have little opportunity of keeping themselves abreast with the ever-growing mass of medical knowledge. Remember what is the life of a general practitioner in a great practice. I do not believe there is a harder life. I am sure there is no more beneficent life led by any set of men upon the face of this earth. It is a hard day-to-day struggle. Ah! a day-to-day and night-to-night struggle with disease; no certainty of repose, no habitual opportunity of study, constant aid to the poor, to the needy and to the suffering-aid in many cases but ill-remunerated, aid which calls forth constantly and steadily an amount of unknown and unrecognised self-devotion which, I am sure, must move the heart of anybody who thoroughly realises it. Now, to these hard-worked and over-worked general practitioners comes the duty of attempting to make themselves familiar with the latest researches in medical science, the accumulated wealth of medical experience, the vast mass of information contained in medical and other scientific journals concerning the

last researches of medical science. How is it to be done? How can it possibly be done under existing conditions? It cannot be done; and the Polyclinic has set itself to work to give to these men, in their rare opportunities of leisure, on the easiest and the cheapest terms, an opportunity of bringing themselves abreast with medical science in its latest development, of coming into personal contact with the leaders of medical thought, and of carrying back into their own region of special activity this augmented knowledge which it were hardly possible for them to obtain under the existing conditions of stress and strain in which they live. Think what this means, not to these medical gentlemen themselves, but to their innumerable patients. Think how much an institution on the lines of the Polyclinic developed, as I hope to see the Polyclinic develop, may do, not for the education of the medical student, which is amply provided for, but for the education of the medical student after he has become a professional man, when he is, perhaps, as much or even more in need of those educational advantages for which at present no machinery exists in these islands. There is yet a third branch of the activity of the Polyclinic to which I would venture to call the attention of this audience, and it is perhaps the branch which we in this country are most apt to neglect.

#### THE GROWTH OF MEDICAL KNOWLEDGE.

I have spoken to you of the growth of medical knowledge, and surely that is one of the most remarkable scientific facts of the last half-century. I do not commit myself to the year, but it is, broadly speaking, in the last half-century that the medical profession have become, not merely admirable masters of the art of healing, but acquainted, not emperically merely, but scientifically, with the causes of many of those maladies with which they have to deal. In reality it is only in the last half of the last half-century that we have realised to the full extent how much these maladies under which mankind groans are due, not to the natural and inevitable decay of the human organism, but to what is literally and absolutely an external parasitic invasion. So far as I am able to judge, that view of a large number of the real scientific causes of so many of the maladies of humanity is not diminishing, but is increasing in its scope; and, while there is, so far as I know, no example in which a disease originally supposed to have a parasitic origin has now been found to have some other origin, every day the leaders of the medical profession are more and more coming to the conclusion that the diseases whose parasitic origin was never even suspected are nevertheless due to invasions of the kind I have endeavoured to describe. I need not say that in such a company as this I am not going to attempt to discuss the effects which this extraordinary discovery has had upon medical science; I am not going to show how, in the first place, doctors have endeavoured to meet this invasion by a general strengthening of the organism by what are called principles of hygiene, nor how they are prepared to meet it by assisting the natural forces of the body to meet the invader by appropriate medicines, or by such anti-toxins, as serum, that therapy has placed

at their disposal, nor how they are even educating the body to meet this invasion by the various forms of vaccination that have been adopted and are from day to day increasing.

#### THIS COUNTRY LAGGING BEHIND.

I should be going beyond my depth were I to deal with these important aspects, these vital aspects, these leading aspects of the medical science of to-day, and I have only mentioned them in order to lead up to this question, which I put to you in all solemnity and seriousness. Can we honestly say that in this great development of medical knowledge and therapeutic science this country has taken the leading part it ought to have taken? I speak in the presence of gentlemen whose names are of European fame, and who certainly have done their part in the spread of medical knowledge and in the furthering of medical research. I do not forget that in perhaps the two branches of medical advance which have done most to save human life and to diminish human pain-I mean the use of anæsthetics and antiseptic surgical treatment-this country may have a claim to have taken the lead. Happy will be the century on which we are entering if other discoveries are made which will do so much to increase human happiness and to diminish human suffering. And yet, when I have made all allowance for those great claims on the gratitude of the world which I think we possess, it remains the fact that, so far, at least, as I am able to judge, we cannot say that as compared with Germany, or with France, or with Italy, we have done all that, perhaps, we might have done as pioneers of medical discovery. I may be wrong. It is only a personal opinion, given for what it is worth, but I fear that any investigator who set himself in a perfectly impartial spirit to examine the respective claims upon the gratitude of mankind of these great nations would not be able, in all honesty and fairness, to say that we had any claim to take the lead. Now, if that is so, do not you think we-the public, the unprofessional and the unscientific public—are in part to blame for that state of things? Do you think that we have shown a recognition of the duties which fall upon us in this matter? We are proud to say that in this country we leave to private enterprise and to private benevolence duties which in other and less fortunate countries are entrusted to the Government. Yes, that is true; but if that policy is to be successful you must have the private enterprise and the private benevolence, and have we shown the possession of those great qualities in this particular to the extent that we ought to have done? Personally I grieve to say I have no doubt as to the answer that should be given. I do not believe that any man who looks round the equipment of our Universities or medical schools, or other places of education, can honestly say in his heart that we have done enough to equip research with all the costly armoury which research must have in these modern days. We, the richest country in the world, lag behind Germany, France, Switzerland and Italy. Is it not disgraceful? Are we too poor, or are we too stupid? Do we lack the imagination required to show what these apparently remote and abstract studies do for the happiness of

mankind? We can appreciate that which obviously and directly ministers to human advancement and facility, but seem, somehow or another, to be deficient in that higher form of imagination, in that longer sight, which sees in studies which have no obvious, necessary, or immediate result the foundation of the knowledge which shall give far greater happiness to mankind than any immediate, material, industrial advancement can possibly do; and I fear, and greatly fear, that, lacking that imagination, we have allowed ourselves to lag in the glorious race run now by civilised countries in pursuit of knowledge, and we have permitted ourselves to far too large an extent to depend upon others for those additions to our knowledge which surely we might have made for ourselves.

AN INTERNATIONAL COMPETITION.

It is the result of my unfortunate profession that I am constantly engaged in discussions and conflicts, which at the worst have a party significance, but which at the best have but a national significance. But the cause I plead now is not the cause of a party nor of a nation, but the cause of mankind at large. Every discovery which is made in the laboratory in Germany, France or Italy, is the possession not of those countries, but of the whole world. Let us not be backward in this great international competition, which surely may be said, in some senses, to balance with that yet more costly and destructive competition in armaments, and, it may be, in commerce. Here, at all events, the interest of all nations are at one. Here there should be no undue rivalry, or, if there be, the only rivalry we should permit is what nation should add most to that scientific knowledge on which, on more than the efforts of statesmen, politicians, and soldiers, depends the future progress and happiness of These are feelings which I have long mankind. entertained, and have taken such opportunities as I could to express, but which, I think, are not sufficiently realised by our fellow-countrymen. I hope that, at all events, the result of this evening's proceedings may be that the Polyclinic, which is devoted to the great cause for which I have endeavoured to plead, may obtain from those who can give it that assistance which is requied to make it the useful institution which it potentially is, and only requires your aid fully and perfectly to become. I hope I have not pleaded in vain. At all events, the cause is one in which I firmly believe, and if this country allows itself to be passed in this race I should regard it as a greater national calamity than a lost market here or some national contretemps there. I should feel the higher life of the nation had proved itself inadequate to our national necessities, and that we, who certainly of all nations in the world are able to provide adequate means for our men of science to develop those great capacities which in so many branches of science bave made us the leaders of thought for all mankind—that we have been failing shamefully in our duty if we allow ourselves to be surpassed in this particular branch by every civilised nation in the world. I hope I have said enough to justify me in asking you to drink with enthusiasm and subscribe with generosity to the great cause of medical science which I have pleaded to-night.

The toast was drunk with enthusiasm.

### ANNUAL MEETING OF THE COLONIAL NURSING ASSOCIATION.

A LARGE and fashionable audience was present at the fifth Annual Meeting of the Colonial Nursing Association, which, by the kind permission of Lord and Lady Londonderry, was held at Londonderry House, Park Lane. Among those present were Sir Hubert Jerningham, Sir Archibald and Lady Alison, Sir Henry Stanley, Earl Grey, Earl of

Westmeath, and many others.

EARL GREY occupied the Chair. He opened the proceedings by saying that it gave him great pleasure to see such a large audience, which proved how great an interest was taken in the Colonial Nursing Association. Mrs. Francis Piggott, who deserved the deepest gratitude of all English men and women, was the first person to whom the idea of providing nurses for our sick abroad had occurred, and it was owing to her own sad experience in Mauritius of seeing three young Englishmen succumb to disease from the lack of attention that struck the kev-note of this Association. Mr. Chamberlain had taken the deepest interest in the Colonial Nursing Association, and Mrs. Chamberlain had been instrumental by her great and untiring efforts in raising £3,000. The sum required was £5,000, and the Chairman expressed his opinion that it ought to have been forthcoming in the furtherance of so noble a cause.

Earl Grey expressed his appreciation of the honour conferred on him in being made President of the Association, and referred with deep regret to the death of the first President, Lord Loch. He said that Lord Loch has been the first to appreciate the importance of this Association, and he first realised the usefulness thereof to the Colonies and

the Empire at large.

The Chairman added that he was proud to be an Englishman, and to belong to a country from which the young men were ready to go anywhere and everywhere for the sake of the Empire. It was the mission of the Colonial Nursing Association to help to save this valuable material by sending across the seas trained nurses. The Colonial Nursing Association was desirous of guaranteeing to every nurse sent to the Colonies a salary of £60 per annum and free passage, also to advance money if necessary. Earl Grey wished to acknowledge the receipt of two donations, one of £200, the other £21, as also a cheque of £5 from Lord Crawshay.

EARL ONSLOW said he associated himself with Earl Grey in thanking Mrs. Piggott for her untiring efforts in the interest of the Colonial Nursing Association. He was happy to think she would still

remain Hon. Secretary, and would give her invaluable services in the choice of nurses. Onslow said that as regards the progress of medicine in general up to the present, though it was said that surgery had advanced more rapidly than medicine, the nursing of the sick, if comprised under the latter term, had made rapid strides in recent years. All those who had suffered from typhoid

-or enteric as it is called in South Africa-were aware of the comfort, and appreciative of the ability

and kindness of our nurses, and of the noble women who risked their lives for the comfort of our sick and wounded in tropical countries, as exemplified in

the present lamentable war.

Contumely had been heaped on some ladies who had gone to South Africa to help the wounded, and they were classed with grasshoppers, flies and other plagues of Egypt; it was said of them that not being able to don khaki and go to the front to see the "fun," they donned cotton instead for the same motive. It was a pity to speak thus of ladies, who were never lacking in courage to face a hot climate

and help to combat disease.

By the kindness of the Editor of the North American Review, the Committee were enabled to republish, for distribution in leastet form, Mrs. Chamberlain's admirable article on the history and work of the Association, in which she has taken the kindest interest; personally, also, she has worked hard and should receive the unstinted gratitude of all British men and women. In 1899 only 37 nurses were sent abroad, this year 67 had gone. Imperialism was now a fashion, but it should be a creed, and should consist, not alone in fighting for one's country, but in the upholding of such principles as the abolition of slavery, promotion of Christianity, and the support of the Colonial

Nursing Association.

Sir CUTHBERT QUILTER said, in seconding the adoption of the report, he had little to say about accounts which were ably managed and excellently audited by a distinguished firm. He wished to say something about the passages of nurses abroad. Formerly the great steamship companies made a reduction for nurses, but he was sorry to say the P. and O. Company had withdrawn this trifling concession, and their example had been followed by the North German Lloyd. This was a sorry way of showing appreciation of the good done by nurses in ports to which these Companies owed much of their prosperity, and he must add that not alone were nurses now charged full fare, but an additional charge of 10 per cent. was made for the rise of coal! He appealed for more annual subscriptions. They had only seventy-four regular annual subscribers. bringing in £173 a year. If we are to be Imperial in the best sense it should be an object to help to

save life in trying regions.

Col. Sir James Willcocks said he would like to say a few words about West Africa in connection with nurses. They were indeed badly wanted there. When he first went on the Niger, there were no houses and little food; they were, however, lucky in having nursing sisters to save life. Officers in that terrible climate came out of hospital only to return, but the nurses were never ill-they had no Col. Sir James Willcocks told one or two interesting stories of the estimation in which nurses were held by the British and native soldiers, and specially spoke of Matron A. Ward and Nursing Sister K. Nevill, both of the West African Frontier Force. These ladies, although they had completed over a years' service in West Africa, volunteered to serve with the Field Force. They rendered most valuable service in that trying climate, and by their kindly care and devotion to duty alleviated much suffering. Of the seven Nursing Sisters employed with the Force, he specially recommended the two mentioned; and it was satisfactory to know that

they have received the Royal Red Cross.

The Lady Balfour of Burleigh, the President of the Scottish Branch, then spoke a few words, but they were enough to show how deeply she had the interest of the Colonial Nursing Association at heart. She said she spoke under difficulties, as hitherto there had been no meeting of her branch, but she had contrived by judicious methods to collect some money, notably a cheque for £105 from Lord Strath-She thought all sorts and conditions of people should be interested in the Colonial Nursing Association—Colonial residents, ship-owners, mer-chants, &c. She alluded to the good work done by Mr. A. A. Gordon, the Hon. Secretary of the Scottish Branch, and concluded by expressing her opinion that it would be better to provide funds for saving the lives of the men than for collecting money for their widows.

Mr. WINSTON CHURCHILL said he had been asked specially to allude to a new departure of the Colonial Nursing Association, namely, the starting of a Sick Pay Fund to provide temporary financial assistance to any nurse who may become incapacitated during her connection with the Association. Though every precaution is taken before dispatching nurses, and each candidate is previously examined by Dr. Patrick Manson, experience has shown that a certain percentage of ill-health must be reckoned with, and the Committee wish to be in a position to afford help in cases of obvious need. The colony employing the nurse would be expected in such a case to contribute towards any relief it might be decided to grant, but the Home Associa-tion should, it is felt, be in a position to supplement it. Although sent out physically well there had been two cases of severe illness of nurses, one in Japan and one in the Malay Straits.

In order to raise the nucleus of such a fund, it had been arranged to hold a Ball in February. In consequence of the National mourning the Ball was postponed, but it is hoped to hold it later in the

year.

As to the use and abuse of lady helps in South Africa, Mr. Churchill wished to say he differed entirely from those who said disagreeable things of The sick and wounded soldiers anyhow appreciated them. The famous surgeon who had passed such strictures on women had no doubt rendered valuable—but not entirely gratuitous—services. He begged to add that every one, no matter what his politics, could unhesitatingly help the Colonial Nursing Association in its splendid work by giving and giving liberally. In conclusion, Mr. Churchill supported the acceptance of the report.

Sir HUBERT JERNINGHAM, on rising, said that a glance at the report only was needed to show what progress had been made by their Association. His interest in the same was deep as he had been connected with it since its inception, and indeed had been present six years ago, 6,000 miles from here, when Mrs. Piggott in his presence developed the scheme, which had since assumed such dimensions, to the Governor of Mauritius. He considered that good nurses in the Colonies were essential to our health, and consequently to our prosperity abroad. In conclusion, Sir Hubert said the sincere thanks of the Association were due both to Mr. and Mrs. Chamberlain, the latter for her untiring exertions in the cause, the former for the attention he, as Colonial Secretary, had brought to bear on this work of mercy, the supplying of cultured trained nurses for our Colonies.

The EARL OF WESTMEATH, the Vice-President, was the last to speak, and in a witty and telling speech he proposed a vote of thanks to Earl Grey, and begged all present to give a donation to the "record-

ing angels" at the door.

In terminating the meeting, Earl Grey proposed a hearty vote of thanks to Lord and Lady Londonderry for placing their beautiful house at the disposal of the Colonial Nursing Association for their meeting.

NOTE ON THE RAPID CURE OF TROPICAL FEVERS BY THE ADMINISTRATION OF QUININE BY INTRA-VENOUS INJEC-TION.

By W. LEONARD BRADDON, F.R C.S.

[Reprinted from Medical Archives of the Federated Malay States. ]

In a valuable article on malarial fever, in Allbutt's System of Medicine," Dr. Osler says, "The physician who at this day cannot treat malarial fevers successfully with quinine should abandon the practice of medicine.

The emphasis in this sentence is mine. So pronounced a dictum from so eminent a leader of medicine seems to form an indictment against even the low case-mortality for fever ruling in the Federated Malay States' Hospitals.

For instance, the deaths from malarial fever in the Negri Sembilan Hospitals during 1899 were under 2 per cent. of admissions (17 per thousand). It is true that Dr. Osler mentions that "of 616 cases [of malarial fever] which were under observation in the Johns Hopkins Hospital during the first five years of its work, there were only three instances of this [pernicious malarial] type, two of which terminated fatally."

The form of fever most prevalent in the tropics, however, is, according to Plehn, Koch and others, identical precisely with that which northern observers call pernicious or malignant tertian, the æstivo-autumnal fever of the Italians. Having no experience of these fevers elsewhere I content myself with calling the remittent fever, severe, malignant, and often fatal, with which we generally have to deal out here, "tropical fever." We are agreed, I think, it is usually of tertian period. The complexity of the infection renders the period usually difficult to distinguish; parasites of every age being usually found swarming in the blood simultaneously. The morphology of the parasites, as I have observed them, agrees more closely with the æstivo-autumnal forms described than with any others, small ringand seal-shaped forms being common. Pigment is so fine that the forms are often taken as hyaline. Another appearance, differing from any I have seen described or pictured, is that of a dotted irregular ramification or network of unequally chromatophil substance throughout the corpuscle; the appearance bearing close resemblance to a mycelial formation. For brevity I call such forms—the commonest with which I meet—"mycoid."

Death in such cases is brought about by the sudden onset, which there is usually clinically nothing to lead us to foresee, of what are called "pernicious attacks." In any case such an attack may occur, and it is clear, therefore, that so long as parasites remain in the blood there hangs over every

patient a sword of Damocles.

According to all authorities the treatment of the pernicious as of the simple intermittent-here I again quote Dr. Osler-" is comprised in one word, quinine." How is that drug best and most effectually administered? We are all, unfortunately, acquainted with cases in which quinine given for prolonged periods, and in even heroic doses, fails. It fails to bring about complete disappearance of the parasites, within a period at which, if a perfect specific for all cases of malarial fever, it should destroy them. I am loath to utter a word to shake faith in quinine, which is undoubtedly the only, and a true and specific cure for malarial fever. But there occur such cases as I have mentioned where, as ordinarily administered, its usual good effect is not obtained. I do not lay the blame on the quinine. I believe it to be the mode of administration. Given per orem, it is possible that chemical changes occur in the stomach which have the effect of altering its constitution; or again that organ may, in some cases, be incapable of, or resist its absorption in such a quantity as will be sufficient when finally delivered into the blood to antagonise the parasites. It may well be—and this seems to me very likely that the cells lining the glands or lacteals or capillaries may be themselves so affected by the action of the drug so as to prevent the usual inward osmosis. An observation of my own, which I will detail later, shows that quinine is a powerful local anæsthetic. Upon the mode of action of the drug upon the parasites there is yet division of opinion; some holding that it kills the plasmodium by direct action in all its stages; others that it is most effective against the young newly liberated spores, and very young intra-corpuscular forms, the fullgrown forms being unaffected by it; yet others that it is only upon the last-mentioned phase that it has action. Crescent and flagellated bodies are certainly unaffected by it. It follows that the time at which quinine is best administered is equally a matter of dispute. I know of no observations which show how long a given dose of quinine remains in the blood-stream. Nor, so far as I know, have any series of cases been published to show the results obtained

by administering the drug at particular stages of the disease.

Manson says of simple intermittents that "a fever-fit once begun cannot be cut short by quinine," and Osler states that administered some hours before a paroxysm it will not interrupt the cycle of development, but will, by destroying the products of segmentation, check the succeeding paroxysm. Given in a double tertian he says that it will not destroy the half-grown parasites in the blood which will cause the chill to-morrow but it will destroy those the development of which would have produced an attack on the succeeding—the third—day.

On the other hand, in dealing with severe remittents, especially in pernicious states, both Osler and Manson urge that quinine should be given at once by the most rapid method, in order to obtain effect as soon as possible. It would seem that, unless quinine has direct action on the maturer forms of the parasite, it must be quite futile to expect any immediate benefit from such a proceeding.

Bacelli, however (quoted by Celli), shows that entirely comatose cases may be rapidly benefited and revive, as a result of immediate and powerful dosage with quinine, introduced in solution into the

veins.

My own experience lends apparent support to both the main views enunciated. In numerous cases, in which I have employed intravenous injection of quinine, in which there were parasites at all stages of growth, a complete disappearance of all parasites and clinical manifestations has followed the administration of a single dose. In other cases, where one dose only was given, the fever and the number of parasites due to have resulted from the generation which was mature when the dose was given, have disappeared, or become diminished, while the paroxysm, and the parasites of the following days, were unaffected. I am inclined to believe that quinine directly destroys all forms of the parasite (except the crescents) actually circulating in the blood at the time at which it is given. This is supported by the observation that, while the parasites introduced in a living film of blood into a solution of methylene blue ordinarily stain very slowly (ten to fifteen minutes), after the intravenous administration of quinine staining occurs almost instantaneously. In this view, if given in sufficient doses, it should destroy all the parasites in the system to which it can gain access. It is, supposable, however, that the spores after liberation do not always immediately attack fresh corpuscles, and that as certainly sporulation takes place prinpally in the spleen and bone-marrow. It is in these, and perhaps other parts, that the intrusion of the spore into the erythrocyte takes place, under conditions which, it may be suggested, are practically extra-vascular, so that, while all circulating forms are destroyed by the quinine at their source of origin, the headquarters at which infection of the discs is carried on, they are in some way protected from its action.

It is to be conceived that, while the intra-corporeal cycle of growth of the tropical parasite occupies forty-eight hours, the exactness of recurrence of this

period clinically is due to some physiological periodicity of function affecting the organ in which, or the conditions under which the parasites effect

occupation of the corpuscles.

For cases occur in which at the beginning of the attack very few parasites of any size are to be found, whereas an hour after they are extremely numerous and of all sizes; which seems to me to afford very strong support to the view expressed, the fact being explicable only on the assumptions either that the discs become infected only at a particular time, or that affected discs are secluded until the arrival of a time physiologically favourable for their circulation.

From this point of view the best time to administer quinine is not when the parasites exist in greatest number in the circulating blood, but before they have multiplied themselves by division; since there is no advantage in waiting to attack the spores, if the adult forms are equally unfavourably affected, or are destroyed by the medicine. This period would seem to be during the onset of the paroxysm, on the upward grade of temperature—clinically the shivering stage; which, in tropical fever, as seen here, generally occurs in the forenoon or at mid-day.

Whatever views or methods be adopted, the essential object remains the same: to destroy the parasites in the completest and most rapid manner possible. Following the instructions of Bacelli for intravenous injection of quinine, which he used it would appear only in comatose and other pernicious conditions, I became struck with the simplicity, surety and apparent innocuousness of the method.

The results, in some cases, are extremely striking and show that quinine will sometimes produce immediate and specific effects if admitted through the vein, when its continued administration by tle

mouth has proved unavailing.

On the other hand, in cases where death has not been averted by this method, the reason would seem to be that the drug has not been administered sufficiently early, or in sufficient doses; sometimes the malarial fever has been complicated with another form of remittent of which the cause has not been identified, and the pyrexial stage of which occurs, in opposition to ordinary malarial attacks, about

6 p.m., or later in the evening.

For instance, a Chinese was admitted, comatose, with a history of fever of fifteen days' duration. The blood examination revealed small unpigmented tropical parasites of three generations. He was emaciated, and an opium smoker; anæmic, constipated; temperature on admission, at 5 p.m., 103 degrees. Ten grains of hydrochlorate of quinine were given by the vein on the first day; and  $\frac{1}{100}$  gr. strychnine ordered every hour. The second day the temperature, at 6 a.m., was 99 4 degrees, pulse 148, soft, feeble; respiration, oppressed and shallow, 56. There was no revival of consciousness. The temperature slowly rose to  $102 \cdot 4$  degrees at 6 p.m. On the third day the temperature at 10 a.m. was 104 degrees, when another injection of 10 grs. was made, and cold sponging employed, which reduced the temperature to 103 degrees, when he became partially conscious,

and was able to drink; but after a further fall to 102 degrees, at 6 p.m., the fever rose again to 104 degrees at 10 o'clock, the pulse being 162, respirations 60. A further injection of quinine was given, and temperature was reduced a point, but the rapidity and feebleness of pulse and respiration increased rapidly, and he died at 10.30 p.m. In such a case the fatal issue may have been inavertible, but I am inclined to think that malaria was here

complicated by another form of fever.

Case No. 2 was a Chinese admitted for fever, coming on every day, for ten days, in the evening. The fever began with a shivering fit. He was not an opium smoker, but looked old, and was very weak and emaciated. The blood showed a few small marginal tropical parasites. He was given 10 grs. of quinine by intramuscular injection on the second day of admission; and on the fourth day no parasites were found. The temperature chart showed a gradual rise throughout each day to about 102 degrees or less at 6 p.m. which ceased on the fourth day. From the fifth to the eleventh days there was no pyrexia, and there were no parasites. On that day he had headache and a paroxysm which began at 6 a.m. and reached crisis at 11 a.m. From six to ten very small unpigmented parasites were to be seen in every field. An intramuscular injection of 10 grs. of quinine was given at 11 and repeated at 2 p.m. and the temperature fell to 99 degrees at 6 p.m., in addition a mixture containing 10 grs. quinine was ordered to be given thrice daily. The following day showed slightly fewer parasites, five to eight in every field. An intravenous injection of 10 grs. of the hydrochlorate in 1 oz. of normal saline solution was given at 10 a.m., temperature being 101 degrees. When seen again at 12, the temperature was 103 degrees, the patient was collapsed, and entirely unconscious, with some delirium; there was "floccitatio," the head was drawn back and turned to one side, with conjugate ocular deviation; pulse weak and frequent, 78; respiration 25; and general muscular tremor. At 12.30, an injection of  $\frac{1}{100}$  gr. strychnine, and ether were given, and ordered to be repeated every half hour. At 1, the temperature was 105 degrees; pulse feeble, 100; respiration 40; there was trismus. Cold sponging was employed, and 15 grs. of quinine dissolved in 30 czs. hot sterilised  $\frac{3}{4}$  per cent. salt solution injected into the vein. There was a short improvement of the pulse, which became stronger, and fell to 80; the trismus and rotation of head and conjugate deviation of eyes disappeared. This improvement was, however, only temporary and the patient died at 2.10 p.m. In this case, it may be supposed that the congestion of the brain on the second day of the second attack, which immediately caused death, was the result of the action of a brood of parasites which had not been affected by the quinine administered in the prior twenty-four hours. It is worthy of note also that this patient was taking in addition 10 grs. of quinine thrice daily per orem throughout the interval between his two attacks.

A third case, illustrating the uncertainty of prognosis in cases of tropical fever, is that of a Tamil admitted for irregular fever of fifteen days'

duration. Large pigmented parasites (one to every two or three fields) were found on day of admission at 8 a.m.; and an intravenous injection of 10 grs. of quinine given at 2 p.m. This dose was repeated by intramuscular injection at 8 a.m. and 6 p.m. on the second day; and per venam at 12 a.m. on the third day, after which all parasites disappeared. A mixture, containing the same dose, was given thrice on the fourth and fifth days. But the patient died on the latter at 4 p.m.

Cases illustrating the superiority of the intra-venous over other methods of employing quinine

may be quoted in great number:—
Case 1 was a Chinese admitted in a state of coma, having had fever for eighteen days. Pulse weak and irregular, 160; respirations shallow and laboured, 50; temperature 103 degrees; anæmic, constipated, tongue dry, sordes. At 6 p.m. an intravenous injection of 10 grs. of quinine was given in 2 ozs. n.ss. The abatement of symptoms was rapid and the patient was able, the following morning, to speak and walk. Small unpigmented parasites were "plentiful." On the second day there was apyrexia. On the third day parasites were still numerous; 10 grs. of quinine was given by intramuscular injection at 6 p.m., and this was repeated on the fourth and fifth days. On the sixth the patient left the hospital recovered. On the fourth and fifth days there had been diarrhea with offensive black stools. The temperature chart showed a gradual rise of temperature throughout each day till 6 p.m., so that it may be queried whether this case was one of uncomplicated malaria. But there could be little doubt that the quinine given at the beginning was of the greatest efficacy in restoring this patient from coma to consciousness.

No. 2 was a Chinese, brought in almost completely comatose, after fever of fifteen days' duration. Tropical parasites being found in the blood, an injection of quinine (10 grs.) was immediately given per venam. Consciousness partially returned the second day, so that he was able to hear and attempted to answer loud questions, though stools and urine were passed involuntarily under him. On the third day he was able to get up and walk. The blood having become free of parasites no more medicaments were given, and he was discharged after

a week's further observation.

No. 3, a Tamil, admitted for severe fever; blood examination on the second day showing two to five parasites in every field, intravenous injection of 10 grs. of quinine was given at 8 a.m. on this day. No rise of temperature took place, but there was a sharp paroxysm on the third day; the same dose was then repeated; the parasites had entirely disappeared on the fourth day, and there was no return of them or other sign of fever during several days further during which the patient was kept in hospital. Such a case illustrates the inefficacy of quinine administered on a given day to destroy or prevent the development of the parasites which will produce a paroxysm on the day next following. It follows from this consideration that it is desirable in every case of tropical fever to administer quinine -preferably per venam-on each of two successive

days. This will usually be found sufficient for

But examples of resistance even to this potent form of medication occur-e.g., No. 4, a Chinese, admitted for fever of a week's duration-showed temperature, on first day of admission at 12 a.m., 103 degrees; pulse 112; respiration 40; tropical parasites of all sizes, the largest pigmented, eight to twelve to a field. The chart of the case shows that there were regular mid-day paroxysms of diminishing severity for six days, during which the parasites constantly fell steadily from the above numbers to nothing. Five grains of hydrochlorate of quinine were given per venam on the first and every succeeding day at 12 a.m. before the fever was cured. It is likely that in this case a dose of 10 or 15 grs. to start with might have secured the same result.

#### SHANGHAI-ANNUAL REPORT OF THE HEALTH DEPARTMENT, 1900.

DR. ARTHUR STANLEY, the Medical Officer of Health, Shanghai, in his annual report, gives an interesting account of the work of his department, of the vital statistics and of the diseases prevalent in the settlement. The growth of population of Shanghai in both the foreign and native communities is most striking and interesting. The foreign population has increased in number during the past five years from 4,684 to 6,774, and the native population from 241,000 to 345,000. The death-rate amongst the former per 1,000 per annum amounted to 14.32, and amongst the latter a death-rate of 11 per 1,000 is given. It must be remembered, however, that Shanghai is practically a foreign settlement to the Chinese, and that the majority of the Chinese population consists of young men who have their homes and their wives or families in the hinterland, and when illness overtakes the Chinese in Shanghai, they frequently leave the settlement and go to their native villages. This accounts in a large measure for the smaller death-rate amongst the native as compared with the foreign community.

#### FEMALE INFANTICIDE.

It is popularly supposed that the Chinese do away with the female infants at times, but the statistics given by Dr. Stanley help to refute the idea in a great measure. Of 992 children under 15 who were registered in 1900 as having died in the colony, 512 were boys and 480 girls, a fact which would seem to show that female infanticide does not prevail to any extent in Shanghai at all events.

### THE PREVALENT DISEASES.

The enumeration of diseases met with in Shanghai is full of interest, inasmuch as it will be observed from the appended list that most of the diseases met with in temperate European climates prevail in Shanghai—a marked contrast to the diseases in the Hong Kong register, where such diseases as scarlet fever, diphtheria, measles, and even typhoid fever are altogether absent or much more rarely met with. In this list, it will be observed, rheumatic fever finds no place, nor does leprosy or hydatids. Such tables as these are full of information for the study of that most interesting and instructive subject—the geographical distribution of disease.

# Infectious Diseases notified among the Foreign Community during 1900.

Small-pox	144		5	Malaria		 460
Cholera			0	Lobar Pneumo	nia	 49
Typhoid Fer	ver		85	Infantile Diarr		 67
Typhus Feve	er		1	Chicken Pox		 19
Dysentery			246	Dengue		 5
Diphtheria			43	Erysipelas		 1
			26	Rötheln		2
Scarlet Feve	er		15	Mumps		 108
Whooping C	ough		81	Plague		 1
Influenza			247			
Tuberculosis	3	4.4	52	Total		 1,463

#### TYPHOID FEVER

is at least ten times more prevalent in Shanghai than it is in England, but the disease is of a milder or less fatal type.

#### TUBERCULOSIS.

Tuberculosis has caused fourteen deaths among the resident foreign population during 1900, a proportion of one death to every seven. This disease is also very prevalent amongst the Chinese population. Tuberculosis is common all over the world wherever the population is closely aggregated together. This close aggregation is probably the cause of its prevalence among the Chinese population, and its prevalence among the Chinese is the chief cause of its exceptional incidence among the foreign population. For this reason preventive measures are difficult of operation.

#### BACTERIOLOGICAL LABORATORY.

The official work connected with the control of the Department occupied so much time during the year that the desired attention could not be devoted to investigation. The subjects attacked, however, have included beri-beri, the etiology of local diarrheas, the preservation of the virus of rabies in glycerine, the variations of the incubation period of rabies, the intra-cerebral inoculation of rabies and the comparative bacteriology and chemical composition of waters of the Shanghai district including part of the Grand Canal.

Among prophylactic remedies the preparation of calf vaccine occupies the largest place. Mallein and tuberculin have been prepared. Haffkine's plague prophylactic has been prepared on a small scale, but stress of other work has rendered it impossible to prepare a large quantity, so that arrangements have been made for the transmission of a further quantity from the Bombay laboratory in case of need. The preparation of the cholera prophylactic has been rendered unnecessary on account of the prolonged immunity from cholera. Anti-typhoid inoculations are in abeyance awaiting more definite results of its success on a large scale in South Africa and elsewhere.

#### PASTEUR INSTITUTE.

The Shanghai Pasteur Institute after six months' preparation was opened to the public for treatment

in March, 1899, and the series has been continuously maintained, some 460 rabbits having been inoculated.

Up to the present date seventeen persons have received the treatment, including five for prophylactic purposes. In six instances the dog which caused the bite was proved to be rabid by inoculation in the laboratory.

The comparative fewness of cases receiving the Pasteur treatment in Shanghai is explained by the fact that the Chinese population do not as yet seek the treatment after rabid-dog bite. However, five Chinese, including four laboratory assistants, received the anti-rabic injections.

ceived the anti-rabic injections.

The further work done by the Health Department is reviewed under food, laundries, milk supply, meat supply, and last, but not least, the work done by the nurses connected with the Nursing Home.

Dr. Stanley seems to have the sanitation of Shanghai well in hand, and the municipality are to be congratulated upon the great advance made by them under the skilled direction of their able Medical Officer of Health. It is satisfactory to know that the British folk are taking serious note of sanitary work in their settlements and colonies in China, and that they are taking the lead in such matters instead of being set the example by the Governments of other countries, as is too often the case in our wide-spread empire.

#### HONG KONG—REPORT OF THE CIVIL MEDI-CAL OFFICER FOR THE YEAR 1900.

DR. J. Bell, Acting Principal Civil Medical Officer, in his report brings to notice a number of important facts in connection with the medical and surgical work of the Civil Hospital. As a record of the prevalent diseases met with amongst Europeans in Hong Kong the subjoined list is of interest.

	Gener	al Diseas	Ses		1	European	ne
German M				-20	0.0	2	4.7.
Plague				- 2.2		3	
Influenza	100		1.	4.3		45	
Simple Fe	ver, con	tinued				7	
Enteric Fe	ever					21	
Dysentery						40	
Malarial F	ever					160	
Malarial C	achexia					2	
Phagedon	a					2	
Scurvy						1	
Alcoholism	1					55	
Rheumatic	Fever					7	

It will be observed that measles (except German), scarlet fever, and mumps, have no place in the list, and that malarial fever is the most prevalent ailment. Seven cases of rheumatic fever are also reported, a fact in the record of disease which must be carefully noted, for rheumatic fever has heretofore played but an insignificant part in the category of disease in the Far East. It must be remembered, however, that the admissions to the Civil Hospital in Hong Kong largely, if not mainly, consist of the crews of ships and of persons passing through the port. Yet the recorded cases of rheumatic fever

amongst Europeans in the East have been so few that the climate was thought to be in some way responsible for the immunity attaching to this fever. It would appear doubtful after reading the above report whether immunity from rheumatic fever is really a fact.

#### SURGICAL OPERATIONS.

This list is interesting in many ways, and in none more so than in the very first of the diseases for which operations were necessary. The table is headed by the statement that fifty-six cases of bubo were either scraped or incised. The prevalence of buboes requiring such treatment has often been remarked upon, especially by Godding, Cantlie, Begg, and others, and the question comes to be what are the operations for which such treatment is necessary? They can but seldom be of venereal origin; operations for glands of such origin are rare in European hospitals, and the large number mentioned in the Hong Kong report is significant. They must be for the most part of non-venereal origin, if so what is the pathology of the ailment? Are they cases of so-called "pestis minor"? If so, the medical men in Hong Kong have an excellent opportunity of testing the relation such buboes have to plague; previous to the outbreak of plague in the Far East they were practically unknown.

#### DISEASES AMONGST THE CHINESE.

The Tung Wah Hospital is a native hospital managed by a Chinese committee, but used largely as a workhouse and as a refuge for the dying. Patients when coming to the hospital are offered treatment by either Western or Chinese methods, and during 1900, of the 2,981 admissions 57·7 per cent. were under Chinese native treatment; 32 per cent. were treated by Dr. Chung according to European methods, whilst 10·3 per cent. were transferred elsewhere.

Table I.—Return of Diseases and Deaths in 1900, at Tung Wah Hospital, Hong Kong.

	•	Dise	ases.			dmissions ring 1900.
GENERAL DIST	EASES-	-				
Small-pox					 	2
Measles					 	1
Mumps						1
Influenza					 	12
Diphtheria					 	1
Enteric Fev	er				 	16
Cholera					 	1
Dysentery					 	49
Plague					 	401
Malarial Fe	ver—					
(a) Intern	nittent	Type	undiag	gnosed	 	172
(b) Remit	tent				 	357
(c) Pernic	cious				 	12
Beri-beri					 	361
Erysipelas					 	5
Septicæmia					 	16
Tetanus					 	10
Tubercle					 	8
Leprosy, Tu	bercula	r			 	2
Syphilis, Sec	condary				 	53
Rheumatism	1				 	41
New Growth	, Non-	malign	ant		 	4
,,	Mali	gnant			 	8
Anæmia					 	31
Debility					 	48

			seases.		Admissions during 1900		
LOCAL DIS							
Diseases	of Ner	vous Sy	stem		 	99	
Diseases	of the	Eye			 	11	
,,	,,	Nose			 	1	
. ,,	,,	Circula	tory Syst	tem	 	63	
,,	**		tory Sys		 	491	
,,	,,		ve Syster		 	249	
,,	,,		atic Syst		 	28	
,,	,,	Urinary	System		 	62	
,,		Male Or	rgans		 	4	
,,	,,	Female	Organs		 	7	
,,	,,		of Loco		 	27	
,,	,,		Tissue		 	85	
,,	,,	Skin			 	80	
Injuries,	Genera	ıl			 	5	
	Local				 	156	
Poisons					 	1	
			Total	100	 12.5	2,981	

In the Tung Wah Hospital the Chinese submitted to 131 surgical operations performed by Dr. Chung, including four lithotomies, one lithotrity, two cataracts, &c.

# PNEUMONIC PLAGUE—RECOVERY UNDER TREATMENT WITH CARBOLIC ACID.

A Greek sailor was admitted to hospital on April 17, suffering from gonorrhœa. His temperature was 101 degrees, with furred tongue and a general apathetic condition, but this latter was thought to be owing to his being unable to speak English. His condition for the next two days was decidedly worse, though nothing definite could be made out. On the 20th Dr. Lowson saw the case and agreed that it was very suggestive of plague, and shortly after this he coughed up some typical bloody sputum which was found full of bacilli. His pulse and general condition being so bad it was thought better to isolate him in a private ward here instead of transferring him to Kennedy Town Hospital. Carbolic acid grs. 20 every three hours was at once started, with brandy, strychnia, &c., to counteract the cardiac depression. After a very few doses of this medicine his tongue, which was dry and brown, soon became moist, and the violent delirium passed into the quiet kind, when he was easily fed and kept from getting out of bed. On the 22nd he was decidedly better-tongue moist and cleaning, breath no longer offensive, and pulse good and no longer intermitting, sleeping well and no delirium. Sputum increased in quantity but no blood. Bacilli still present. Temperature 103 degrees. On the 24th his temperature fell to normal and he was practically well, though he looked very pale and pinched. Sputum had ceased entirely. Under tonics and full diet he rapidly convalesced, and left the hospital on the 30th.

This patient had roughly 280 grains of carbolic acid without any bad symptoms. One case proves nothing, but the high rate of mortality from this form of the disease, the serious condition of the patient and his rapid improvement, makes one feel that the drug had a good deal to do with the successful result.

#### RUPTURED SPLEEN-REMOVAL; RECOVERY.

A Chinese policeman, after being assaulted walked to the hospital, where the signs and symptoms were

those of internal hæmorrhage. The abdomen was quickly opened, blood clots removed, and the spleen ligatured and removed. The organ weighed 16 ounces, and was found ruptured right across from the anterior to the posterior border. The patient did well and left the hospital twenty-four days after the operation.

# Current Miterature.

#### MALARIA.

MALIGNANT MALARIA: APHASIA, RECOVERY .-- A German engineer from a steamer trading between here and Haiphong was admitted on December 24. He was in a curious dazed condition, unable to speak distinctly, and could give no clear account of his illness. Temperature 99 degrees, tongue furred, but no vomiting, and apparently no pain anywhere. Heart and lungs were normal, but pulse slow and very feeble. Pupils normal and no facial paralysis. The splenic dulness was increased, liver normal, but skin and conjunctiva yellowish. A blood slide taken on admission was a perfect picture and showed in the same field numerous crescents, ring-formed pigmented parasites, pigmented leucocytes, and leucocytes containing one, two and even three red corpuscles and parasites. The urine contained a slight trace of albumin, probably due to a stricture which necessitated the urine being drawn off by a No. 4 catheter on the 26th. Under quinine, both hypodermically and by the mouth, stimulants and free purging, the patient slowly improved, and the temperature, which rose daily to 101 and 103 degrees, dropped to normal without any further rise. The speech, however, continued thick and indistinct for some time, and he told us "he couldn't remember the eight words." This latter condition, which distressed the patient very much, gradually improved under small doses of iodide of potassium and arsenic, though there was an occasional hesitancy for a word now and then. The blood slide taken on January 2 (forty-eight hours after the temperature fell to normal) was quite free from malaria. Patient was discharged quite well on January 21.—Dr. Bell, Hong Kong Civil Hospital Report, 1901.

#### MALARIA TREATED BY HYPODERMIC INJECTIONS .-R Quininæ hydrochloro-sulphat . . 2.50 gm. .. 10. gm. -GRIMAUX. R Quininæ sulphat. (neutral) ... .. 10 gm. .. 120 gm. Aq. distil... ... ... M. S. Inject 5 to 10 c.c. -MAURANGE. R Quininæ sulphovinat ... 2.50 gm. Aq. steril... ... ... ... M. S. Inject 1 to 2 c.c. .. 10 gm. -HUCHARD. MALARIA.-R Methylene blue .. ... gr. ij.-iij. .. gr. ij. Quinin, sulphat... gr. ij. Ferri carbonat gr. i. Ac. arseniosi gr. 1-50. M. ft. caps. No. i. In acute fevers one three times daily, in chronic forms one every four to six hours.

MALARIA IN CHILDREN.—In the Brooklyn Medical Journal, April, 1901, Dr. W. A. Northridge contributes an article on pediatric malaria. This subject has been so seldom dealt with, in fact it has been so systematically neglected, that the article is a very welcome addition to the literature, and to our knowledge of malaria.

Diagnosis.-Malaria is so different in its manifestations in children under the age of 5 years, that if one were to depend on the recognition of the ordinary symptoms of malaria as found in the adult, the existence of the disease in certain cases would often remain undiscovered. While the hematozöon does not spare any organ or tissue of the body in the child the nervous system is by far most often and most profoundly affected. This is probably due to the susceptibility to disease of this system in the young. If fever occurs in a child, we must suspect the plasmodium malariæ, and take it into account in making our diagnosis. If the patient's fever is periodical, and if the spleen is found to be enlarged the diagnosis is easy. The four most important symptoms of malaria in the child are fever, periodicity, anæmia, and enlarged spleen. The enlargement of the spleen is not an essential factor in the diagnosis, for not only may its size vary but in early stages the increase in size cannot be made out. In chronic cases, however, the spleen is invariably big and at times of great dimensions.

The infantile type of malarial fever is usually the quotidian, whereas in adults the tertian prevails. In children also it is seldom that any other than the hot stage of the attack is recognisable; chill is generally absent or may be unrecognised; convulsions and involuntary muscular contractions are seen at times. The child is usually drowsy, listless, and yawns frequently, with nausea and vomiting, in about two-thirds of the cases. The temperature is apt to range high, 104 to 108 degrees F., during the febrile attack. Of other features of the disease it is noted that sweating is seldom noticed; periodicity is pronounced; anæmia marked; spleen enlarged; the nervous system is often profoundly affected; a jaundiced appearance is occasionally seen.

Infection.—When children suffer from malaria the nurse or mother will usually be found to harbour the malarial parasite. Usually the tertian parasite will be found in both, but Dr. Northridge relates one case where the mother had tertian and the child had a parasite of a quartan type. The explanation to be offered is probably that the child was infected not from the mother at all but from some other member of the family, or by a neighbour with quartan ague and great anæmia. Often the diagnosis must be made on the periodical return of a high fever, with or without the presence of an enlarged spleen, all other symptoms being absent. Any combination of symptoms with fever may be found, with any other symptom absent or present. For instance, a child may vomit, and this may be followed by high fever, and in a few hours he may apparently be perfectly well again, and playing about. This will be repeated day after day, until the doctor is summoned, and what appeared an attack of indigestion alone will be proven by its

recurrent fever, its periodicity, and its cure under

quinine, to be malarial infection.

Of peculiar types of symptoms Dr. Northridge relates many. A few examples will prove of interest:—(1) A boy, aged 3 years, with a temperature 104 degrees F.; indulged in loud screaming, and at intervals he took the position of opisthotonos. (2) A boy, aged  $2\frac{1}{2}$  years, had marked paresis in the right arm occurring after the fever commenced. (3) A boy, aged  $2\frac{1}{4}$  years, had had attacks of malaria ever since he was 12 months; when first seen by the doctor he was in the midst of an attack of tertian type, and had considerable loss of power in the muscles of the legs with difficulty in walking. (4) A boy, aged 4 years, had fever which recurred every day, with dragging of the right leg with partial paralysis. (5) Girl, aged  $1\frac{1}{2}$  years; the fever was accompanied by twitching and a partial motor paralysis of the left arm and leg.

Amongst other signs and symptoms noted in malarial children are:—(6) Paralysis of the tongue. (7) Partial loss of motion in both lower extremities. (8) Partial motor paralysis of right leg. (9) Malarial bronchitis with slight paralysis of motion in left leg. (10) Syncope in three cases, the attack in each case taking the place of a chill, the fever coming on afterwards. (11) Malarial torticollis and (12) malarial chorea are neither of them rare. (13) Headache. (14) Recurrent diarrhæa accompanied by nausea. (15) Pneumonia is simulated very

closely.

The diagnosis that the above signs and symptoms were of malarial origin was based upon the periodicity of the recurrences and upon the fact that quinine effected relief. Quinine is the specific remedy, arsenic stands next, and children bear both drugs well. Powdered cinchona bark mixed with powdered liquorice root is a convenient and efficient method of giving the antiperiodic.

THE "DIRT-EATING DISEASE," OR ANKYLOS-TOMIASIS.—Connected account of the disease. By Charles Allan Brough, LL.B., B.S., &c., Member (by examination) of the Medico-Psychological Association of Great Britain and Ireland. Price 2s., post free. L. Bruck, Sydney; and Melville & Mullen, Melbourne.

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Clinical Journal.

Clinical Review. Giornale Medico del R. Exercito. Hongkong Telegraph. Il Policlinico. Indian Engineering. Indian Medical Gazette. Indian Medical Record. Janus. Journal of Balneology and Climatology. Journal of Laryngology and Otology.

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## Original Communications.

# FILARIASIS IN BRITISH CENTRAL AFRICA. By C. W. Daniels, M.B.

THE Filaria nocturna is found in many parts of British Central Africa, but its distribution is not uniform.

Specimens of the blood of 687 natives were examined at night and this filarial embryo was found in 35 of them, or 5 per cent.

For convenience I divide the districts from which the natives came as follows:—

District.	No. Examined.	
Highlands (Shire and Angoni)	137	No filaria.
The Upper Shire River	120	Filaria in 1, or 8%.
The Lower Shire River		
The Zambesi and Chinde Rive	ers 100	Filaria in 14, or 14 %.
Lake Nyassa (Southern half)	38	No filaria.
Lake Nyassa (Northern half)		
Other districts	77	No filaria.

Of those from other districts only two, Likoma (22) and New Heligoland (19), were in sufficient numbers for negative results to be of any value. Both these places are islands in the middle of Lake Nyassa.

The distribution of elephantiasis corresponds with that of filaria. In neither the Shire nor Angoni Highlands, in the Upper Shire, the south end of the Lake, nor in Likoma have I been able to hear of any cases, though there have been abundant opportunities for such cases to have been seen if they were present.

On the other hand it is well known to be present in the Lower Shire, the Zambesi, and at the north end of the Lake, and I have seen cases myself in each of these districts.

It has long been known that the further development of these filarial embryos can take place in several species of mosquitoes, and that in consequence these insects are probably required for the

propagation of filariasis.

One mosquito was particularly noted as being common on the Zambesi and Lower Shire Rivers, and also at the north end of the Lake, and its absence from the Shire and Angoni Highlands and great rarity on the Upper Shire River, had also been observed. As this distribution was the same as that of filariasis it seemed probable that this mosquito,\* a large yellow Culex with banded legs and very scaly wings, was the main carrier of this parasite.

On feeding these mosquitoes on a patient with abundant filaria, the anticipation was fully confirmed, as with hardly an exception the mosquitoes so fed contained the filaria in the thoracic muscles. They developed, as described by Bancroft, up to the sixth or seventh day, but after that I had to remove them to the Highlands, and there, after twenty-one days, development was still incomplete, probably on account of the lower temperature.

Experiments were made in the same manner with other mosquitoes, and only one, a *Culer* browner in colour than the other, and found in the Lower Shire and Zambesi, was found to carry them.

The other Culices tried, viz., the two commoner ones in the Highlands; that common on the Upper Shire and a small Culex common in the Lower Shire and Zambesi and found also in the warmer parts of the Highlands, gave negative results, as also did Anopheles funestus, so widely distributed throughout the country.

Other mosquitoes were tried, but the number examined was too small for much value to be attached to the negative results obtained.

In spite of the general correspondence between the distribution of elephantiasis, filariasis, and a mosquito in which the filaria can develope, the relationship does not appear to be simple.

Without a detailed study, including the influence of water supply, I do not think the theory of the

<sup>\*</sup> Panoplites Africanus, Theobald.

necessity of some other factor can be disregarded, though possibly the explanation may be that in some countries the filaria-bearing mosquito is a tank or barrel breeder, and in others, as in British Central Africa, is not.

Filaria perstans was found in one case only. This patient was a native of Mweneutambo, in British South Africa territory. The village is situated amongst the sources of the streams running into Lake Bangweolo, and consequently is on the sources

of the Congo.

It is, however, near the water-shed between the Congo and Zambesi, as well as of the rivers running into Lakes Tanganika and Nyassa. The man had travelled a good deal about the south end of Tanganika and on the plateau, but had never been down the Congo.

I found no *Filaria perstans* in forty other persons from this district, nor in thirty from the eastern shores of Bangweolo, nor in any of the 687 from

other parts of the country.

I have been unable to get any account of any disease resembling "sleeping sickness" in that district, but Dr. Mackay informs me that the natives on the south-west arm of Lake Tanganika seem to be aware of its existence.

ON THE ABSENCE OF CERTAIN DISEASES FROM THE CHANGPOO VALLEY AND ITS ENVIRONS, FOKIEN PROVINCE, CHINA.

By J. Preston Maxwell, M.B., B.S., F.R.C.S.

It is always a matter of extreme interest and importance to note the absence, as well as the presence of disease in a locality; and as the absence of certain diseases in this valley throws a light on some of the more important questions in their pathology, I have ventured briefly to enter into these questions.

The Changpoo Valley is situated in the south of the province of Fokien. Lying about 50 miles south-west of Amoy, it is shut off from the sea by an irregular and broken range of mountains rising

to a height of some 2,000 to 2,500 feet.

The valley itself is about 25 miles long by 10 miles wide, and has several arms which run off among the mountains. Leaving the valley, except where the river which drains it makes its way into the sea through one of the aforementioned gaps, one has to cross mountain passes of some altitude. The valley itself is about 300 feet above sea-level, and about 15 miles from the actual sea line, which is here broken by large sandy bays alternating with rocky headlands.

It is almost entirely devoted to rice culture, other cultivated land being planted with sweet potato, the poppy (for opium), barley, peas, and other vegetables, as leek, garlic, &c. The city is some 800 years old, and is half in ruins, but still has a population of some 20,000 inhabitants, while the country round is studded with large villages. It is difficult to estimate the total population, but the whole region is estimated by the Chinese to contain about one million, and as I have not only got the

Changpoo Hospital records for the past ten years, but have travelled all over the region seeing patients, both those who had come to see me, and in the more serious cases going to see them in their homes, and have seen myself some 30,000 or more individual patients, I may claim to have had a fair amount of experience from which to judge.

#### I.—Specific Infectious Diseases.

Both scarlet fever and diphtheria are entirely absent. Acute tonsillitis is rare, and diphtheria has never been seen either by my colleague, who has had ten years' experience, or myself. As a direct consequence scarlatinal nephritis and diphtheritic paralysis are absent. Diphtheria undoubtedly exists at Amoy, which is our coast port, but there it has almost certainly been imported from outside.

Measles, chicken-pox, smallpox, German measles, and whooping-cough are all met with, but owing perhaps to the warmth of the climate, whooping-cough is a mild, and compared with the disease as seen in England, an insignificant affection. The symptoms of the disease are the classical ones, but complications such as broncho-pneumonia are extremely rare. Measles in like manner is a much less serious disease than in England. Varicella gangrenosa I have met with once. Smallpox is here a disease of childhood, and we have just passed through a serious epidemic which has had a considerable mortality.

Epidemic influenza exists and runs much the same course as at home, and is also attended by its common complication, pneumonia; the mortality, however, is less than at home. Typhus fever exists as a rare disease, and I have seen one well marked case which died. It has not been epidemic here for the last ten years, but of course at any time

may become so.

*Typhoid fever* is endemic, and I hope to be able soon to write a further account of its occurrence amongst natives. When looked for, it does not, in my experience, present the great difficulties in the matter of diagnosis, which have been attributed to it by some writers.

Mumps exists and runs the same course as at home. It is in no wise a serious disease here, and I have not met with a case complicated with orchitis.

Relapsing fever I have not seen, nor has a definite case been as yet diagnosed at the hospital.

Erysipelas runs the same course as at home, and with the same care as is taken at home rarely occurs in hospital. During my time, no case has occurred in a surgical or other patient, although from time to time I have taken in cases from outside for treatment within the hospital.

Anthrax and glanders have not as yet been met with in the hospital practice, and as there is not much dealing with hides and there are very few horses in the region, it may be long before we meet

with a case.

II.—Specific Diseases not generally included under head No. I.

Tuberculosis is rampant in this region. Both lung, pleural, joint and glandular affections are common. Tubercular meningitis, however, appears to be very rare, and I have not met with a case yet.

On the whole it may be termed a chronic, rather than an acute affection, and the lung cases as a rule drift on for years, many of them reaching a

good age.

Syphilis is also terribly common, and all the stages are frequently met with; also occasionally the neglected cases of what one might almost call malignant syphilis, deep excavations of the cranial bones and ulceration into joints occasionally presenting themselves for treatment. In spite of this, aneurism is almost unknown. One doubtful case of abdominal aneurism is found in the records of the hospital. I have never met with a case, and seeing that the people are accustomed to lifting heavy weights, and to severe exercise, such as carrying burdens and sedan chairs and the like, it is the more surprising.

Rheumatic fever is entirely unknown. I have not met with or heard of a case in this region, and in support of my statement, I can adduce the fact that chronic endocarditis is also practically absent.

Excluding cases of anæmia and the like, which present hæmic murmurs, I have met with the following cases of heart disease:—

(a) Three cases of congenital heart disease.

(b) Two cases of senile atheroma with aortic in-

competence.

(c) Two cases of mitral regurgitation in patients who were malarial wrecks. In both there was dilatation of the heart, and I regard this as being the cause of the regurgitation.

(d) One case in which I was unable to make up my own mind as to the location of the murmur and its cause. At the time I saw her the heart was

beginning to fail.

(e) I have also seen acute septic endocarditis in three cases of acute septicæmia, all uterine in origin.

Does not this make the microbic origin of rheumatic fever very probable? In some of the coast ports it is present, and there endocarditis of the usual kind is also present.

Bearing out in a wonderful way the current views on chorea, this disease also is entirely absent. Osteoarthritis is also a rare disease, although it does occasionally turn up, and I have seen a few cases of affected joints, but all only to a slight extent. Charcot's disease, in spite of the amount of syphilis about, I have never seen, and there is no case recorded as having been met with at the hospital.

Malarial rheumatism is often met with. This place is a notably bad malarial region, enlarged spleens and malarial wrecks being common, and joined to this is a large amount of the so-called malarial rheumatism. It is a myalgia and bone pain which is definitely cured and often speedily, with quinine, and that it has nothing to do with acute rheumatism is sufficiently proved by the absence of the latter.

#### III.—GENERAL DISEASES.

Amongst this class there are two notable diseases which are fairly common at home and absent, or practically so, in this region. The one is *chronic granular kidney* and the other *rickets*. The absence of the first is to my mind accounted for by the absence of alcohol, lead and gout. Drunkenness is

almost unknown here owing to the absence of spirits and beer. The Chinese have a native spirit, but it is mild, nasty stuff, and is not consumed in any great quantity. As to lead, I have never seen a case of poisoning here, and there is so little metal work done that that is not wonderful, and as to gout, I have seen one doubtful case. The consequence is that the large hypertrophied hearts not infrequent in England are not met with here, and, as I have pointed out before, aneurism, and I might almost say arterial degeneration, is rare, barring the senile form.

As to rickets: the staple food of the people is rice rendered palatable by the addition of small bits of meat, fish, &c. Most of the babies are breast-fed, and sometimes continue to take the breast for three and even four years. But at the same time, from their earliest days, they have all sorts of food thrust into them, such as sugar, rice cakes, tea, &c. They live amongst filth and get along often as best they can. On the whole they are a great deal out of doors, and that may account for their pulling through this treatment, and one must remember that a great many of the puny ones die. But why is rickets absent? I have only seen one case and that not a severe one. Perhaps it may depend on their open air life and the amount of human milk they get. They are certainly not kept off their feet, and in other words are not coddled. If the mother has no milk to give, she will often beg some from other mothers, and as China swarms with babies and mothers, this is not difficult. I have known of one baby sucking from six different mothers' breasts in the course of a single day.

These few details with regard to some of the commoner diseases met with in England may prove interesting to those who are engaged in investigating the causation of such diseases as rheumatism,

rickets, and the like.

#### NOTES ON A CASE OF AMOK.

By John D. Gimlette, M.R.C.S.Eng., L.R.C.P.Lond.
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THE following incident, which is known in English as "running amuck," is a fairly common occurrence among Malays.

Man, a Mohammedan, aged about 23 years, male, a native of Kedah, single, was formerly in the Perak Police Force, but left the service when his time expired and came to Pahang, where he obtained work

as a carter at Sempam.

About the end of last June, Mr. Rance, his master, noticed that he was odd in his manner; he lolled about the house in a way unusual to him, and one day apparently had a delusion about seeing a monkey on a tree. He asked that it might be shot, and expressed himself as being queer in the head. In a letter dated October 2, Mr. Rance says: "His conduct was a little strange, but I put it down to his not agreeing with the other boys." For a few days he had been acting as a servant, but could not get on well with the others, who were all Chinese. He asked to leave on this account and was discharged.

Mr. Rance had known him for more than two years, and says: "When I heard of the amok I would not believe it, and was much astonished when it turned out to be true."

Man came into Tras, a place near Sempam, where he spent two nights in the jungle, eating little or nothing, and apparently wandering about alone; his legs were scratened with thorns, and he gave this in

explanation on being questioned afterwards.

He was not a ne er-do-well, an opium smoker, nor a foolish extravagant Malay. He had no debts, no quarrel or love affair, but was evidently "sakit hati" with the Chinese. The words "sakit hati," which form a phrase in common use among Malays, are defined in Marsden's "Dictionary of the Malay Language" as resentment, malice, bearing a grudge—heart (morally) ati.

"Ati," however, is sometimes referred to as mean-

ing the liver, but as the seat of affections it corresponds with the word heart. The expression is, perhaps, better defined in an older dictionary (Howson's "Malay Dictionary," 1801) as: spite, envy, offence, vexation, an affront, sorry for, offended

offended.

On July 6, 1900, Man came out of the jungle and went into a house at Tras where his native chief, Ismail, was staying. The house was empty at the Ismail, was staying. The house was empty at the time except for a Malay who was asleep. He took Ismail's sword from under his mat, went out by the back door and walked towards a Chinese shop in the village close by. Five Chinese and a Javanese coolie were sleeping and smoking opium in different rooms. It was mid-day, the men were strangers to Man. He slashed at the first two Chinese who were lying down and killed one, nearly striking his head off with the sword; he gave the other a severe wound on the face, which has since proved fatal. Without uttering a cry he then diverged into a

smaller room where two other Chinamen were lying down. He cut at one and brought him to his knees, killing him at once by a deep wound in the neck; the other man endeavoured to escape, but he wounded him on the arm and pursued him out of the door. The Javanese now seized him from behind and managed to drag the blade of the sword out of the hilt. It was loose. They struggled, Man fought and bit, erying out "I want to run amok."
He finally "slipped away like a fish," to use a Javanese expression, and escaped almost naked into the village, where he armed himself with a large piece of timber. Several Sikh policemen forcibly arrested him, but he struggled so violently that he nearly broke away. At the inquest held the next day he could not be made to give any statement at all, but uttered a long continuous sort of whine. During the night he had done nothing but stamp and howl; the whole of Tras could hear him.

Two days later, the Assistant Commissioner of Police examined him in his cell. He talked in a friendly way, said he could not recollect the time spent in the jungle, and could remember nothing about the murders. He remarked that there were a few more "orang kapir" (non-Mohammedans) out of the world, and concluded that he must have killed them because he was charged with their murder by the Police. He ate rice, bathed and joked during the afternoon (July 8), but at midnight began to shout as if terrified, and was found crouching in the corner of his cell. He said it was full of people who wanted to kill him; he thought he saw them and begged to be taken out and tied up, if necessary, to a tree in the jungle. He quieted down and was brought into the Kuala Lipis Gaol.

Since admission, on July 13, he has been in a solitary cell, quiet, sulky and reserved, but quite coherent and apparently rational, except that his memory of the murders seems to have been com-

pletely wiped out.

Man was certified as not insane by the surgeon

in charge.

At that time he had been under observation for less than a month, and no complete history of the case was at hand. A good deal of the previous history has been gathered since from various sources.

Man is a well-developed Malay, apparently in good physical health. The knee-jerks are exaggerated; there is no history of syphilis. The urine is of low specific gravity-1006-does not contain sugar or albumen; the average quantity passed in twenty-four hours is forty-six ounces. Vision is normal, but the pupils are equally dilated. His eyes are restless, the look being uneasy and the glance un-I am not able to record any physical signs of insanity. There is no aural or nasal disease; the facial expression shows mobility. He persistently denies all memory of the amok, and has repudiated the acts which he has committed, so often, that I consider that he had no motive for the crime, and that this obliteration of memory is a genuine symptom of some phase of mental disease.

On one particular occasion (September 8), at the end of a conversation, his eyes assumed a wild stare, and I believe he was about to spring at me. The European gaoler and a Tamil dresser who were present said that this was the first time that they had noticed any change of demeanour. His expression was that of an insane person; the eyes

glared and were widely open.

In the Indian Penal Code (Mayne), in a commentary on Section 334—"Voluntarily causing hurt on provocation"—the words "to run amuck generally like a Malay" are used, and this is, I believe, the only special reference to amok in any Code. The commentary is as follows:—

"The meaning of this (Section 334, voluntarily causing hurt on provocation) and the following Section (causing grievous hurt on provocation), of course is, that if a person who has received provocation assails the person who has given the provocation, he is only liable to a light punishment. But if, while out of temper in consequence of the provocation he were to attack an innocent person, or to run amuck generally like a Malay, the previous

provocation would be no excuse." The idea that a Malay who runs amuck may be insane does not seem to have occurred to the

commentator.

In the case of Man, three innocent people have been slain, others have been grievously hurt without giving any provocation, and he is liable by law to be hanged. It is well known that this sentence has been often carried out and with advantage in amok trials. In "Hakayit Abdulla" (Henry King & Co., London, 1894) it is recorded that on the death of Colonel Farquhar through an amok in Singapore many years ago, the sentence on the murderer by his own countrymen was that he should be punished by the execution of himself and his wives and children. The translator of the book comments on the severity of Malay laws on such occasions. He remarks, however, that, although they may be obnoxious to our moral code, yet they are the most applicable to the genius of the people, and form notoriously the safety-guards to native rulers, who have never been known to be assassinated.

I need only further refer to the almost classical instance in Penang in 1846, when the Chief Justice (Sir William Norris) passed the death sentence after the most severe summing-up, which, perhaps, has ever been uttered in an English Court of Law. The effect of this sentence seems to have checked the

occurence of amok for a time in Penang.

Similar cases have been tried and sentenced of late years both in the Straits Settlements and in the Federated Malay States. In the Singapore Free Press, of September 13, 1900, the trial of Hadji Alli, who ran amuck in Minto Road last May, is reported. In defence the plea of insanity was set up, but it was not accepted, and the accused was sentenced to death. The trial of Hadji Sukor was held the next day for a similar offence, and, it is said, medical evidence on the state of the prisoner's mind was to the effect that nothing abnormal was noticed.

On the other hand, there are always Malays who, having managed to evade violent deaths, at the time of their amok, from the hands of their comrades, have been subsequently acquitted on the plea

of insanity.

Three such cases are quoted by Dr. Ellis (Journal of Straits Medical Association, August 21, 1897), who also gives a complete account of the Penang murders, referred to above, in his article on "The Amok of the Malays," in the Journal of the Straits Medical

Association, No. 4, Singapore, 1894.

The mere fact of a Malay having committed amok raises no presumption as to his sanity or insanity. He has simply run amuck. The Malays themselves in Pahang do not regard the occurrence as an exhibition of true insanity, being more inclined to ascribe it to spiritual agency, and I think the general tendency throughout the East is to regard it as a vice or crime rather than a disease.

Amok when scientifically considered seems to be a symptom which is subject to much individual variation. In most cases the individual appears to be rendered subconscious, as in somnambulism, by the unrestrained action of his own automatic centres. In some cases, but not in all, this appears to be due to a special pathological condition—a psychical condition, for want of a better word.

This psychical condition seems to result, as it were, from some reflex nervous disturbance or from an auto-intoxication, and to be due to an irresistible

impulse of a purposive character.

It is characterised by: (1) A sudden paroxysmal homicide in the male, with evident loss of self-control. (2) A prodromal period of mental depression. (3) A fixed idea to persist in reckless

homicide without any motive. (4) A subsequent loss of memory for the acts committed at the time.

There is constant grouping of these four cardinal symptoms in many of the cases of amok in which notes have been made. Unfortunately the references are very few in number.

They are cases of the true insanity of amok, and I think the history of Man may be taken as a typical example of a case of this kind of insanity.

In other instances, there may be no subsequent loss of memory, or there may be a doubt about it, and there is some motive for the amok. For the sake of convenience in description these cases may be referred to as instances of "false amok." It is undesirable, however, to regard amok as being, in any way, a specific disease. As an example of this "false amok" I may quote the case of a perfectly sane Malay who was under my care in Pahang a few years ago. On account of the infidelity of his wife he not only attempted to murder the friend who betrayed him but at the same time ran amok generally and succeeded in wounding several other people who had in no way offended him. Both varieties are popularly so-called cases of amok; it is very necessary therefore in making a diagnosis to recognise any definite clinical features, in order to differentiate, if possible, between sanity and insanity. Malays who are quite sane, although perhaps subconscious, during the height of the attack, may be led to commit amok from motives of jealousy or revenge, or from some definite reason such as wounded vanity or a dread of death on the scaffold. A case has recently been reported from British North Borneo in which a Malay convict ran amok on the eve of his execution.

By no means do I go so far as to say that because a person has run amok that he should be exonerated from all criminality. But if he has the four definite symptoms mentioned above and has committed the act of amok without any possible motive, without profit to himself or any other person, without premeditation and consequently in a manner quite different from that in which murder is generally committed, it seems almost a certainty, at least in the case of a civilised person, that it is due to the mental disturbance of some form of insanity.

In the case of a European there would be but little doubt, but in the case of Malays who are so peculiarly apt, as a race, to run amok, the greatest caution is necessary when expressing an opinion. Even the special knowledge of a skilled alienist may

be required.

The difficulty of obtaining any family history from a Malay who has run amuck, or practically from any native, adds to the danger of making a wrong diagnosis, and in this, as in other questions of criminality, any open declaration of theory may put an unsupported witness in a false position in a Court of Law. It comes to be a matter of the highest importance, therefore, that every so-called case of amok should be kept under medical observation for a definite period before trial, so that the mental aspect of each case may be decided on its merits, and the opinion of more than one medical practitioner may be heard.

Amok (a Malay word in actual use pronounced

amox) is thus defined in Marsden's "Dictionary of the Malay Language: "Amuk—engaging furiously in battle, attacking with desperate resolution; rushing in a state of frenzy to the commission of indiscriminate murder; running amuck." It is applied to any animal in a state of vicious rage, and it is interesting to note that the Malay word niamok, mosquito, is derived from it.

The primary idea in the Malay mind is, I believe, that it is a state of violent delirium which should ensue when a brave man's blood is up in the excitement of battle. In Malay tales it is fitting for the hero to lead the attack recklessly, shouting "Amok!

amok!" and taking no count of his foes.

It may be that the stimulus is still a memory image of the ancient battle cry coupled with the proud idea of dying sword in hand, but the kind of amok which now disturbs the public tranquility from time to time, in the days of quiet prosperity, has nothing to do with the actual reality of honourable warfare.

By "running amuck," as I understand the expression, is meant a more or less sudden outbreak which is characterised by an unprovoked attack on any one who may happen to be in the way. Defenceless women and children are frequently attacked.

The intent to kill is imperative, and it is worthy of remark that even the weapon used is chosen with the idea of attaining this object without fail. A stabbing or cutting weapon is invariably used in preference to a club or fire-arm, though of course this may be due to the fact that they are the national weapons and most likely to be at hand.

No case has come to my notice of an amok attack by a female or by a relative of one who has run amuck. It has been said, but I do not know on what authority, that the tendency is a very infectious one, especially among the relatives of those who have perpetrated the act.

Amok seems to be unknown among the Sakei or aboriginal inhabitants of Malaya.

The attack might be induced under the special circumstances of strong suggestion in a Malay native, either male or female. That it should otherwise be almost universally confined to the male sex is a point of some psychological interest.

Some observers are of opinion that amok is merely an exhibition of bad temper; others that it is a kind of suicide on the part of a desperate Malay. For example, it has been supposed that the sane Mohammedan, not daring to take his own life in accordance with the Koran, hopes to attain his object by being destroyed in the frenzy of an amok. And, indeed, many men have been summarily despatched for running amok by their fellow Malays. I think the inference is unjustifiable because the natural prejudice against suicide is almost universal amongst Malays. Ordinary suicide is very rare among the males, although it is not unknown. In 1898 there was a case in Pahang in which a Malay quietly cut his throat in a boat on the Jelai river. He was ill and was supposed to be insane. Another Malay was under my care with a cut throat in Kuala Lipis in 1898. He was obviously insane, and subsequently died in the Selangor Asylum.

Another case occurred in the Jelai district in 1895, in which a Malay girl, on the eve of her marriage, cut her own throat with a razor belonging to her father.

The history is pathetic and has formed material for a novel. Before her death she was asked her reason for having cut her throat, and she replied that, whilst combing her hair in front of the looking glass, the ugliness of her own features was more than she could bear, so she desired to commit suicide, being too ugly to live. The only case of suicide which seems to bear upon amok is one which occurred fifteen years ago in Perak, when a Malay ran amok, and after wounding several people drew his weapon across his own throat and so died, in order, apparently, to prevent himself being captured alive. It is logically incorrect, however, to conclude that a naturally indolent Malay will go to the exertion of a preliminary amok merely with the idea

of bringing about his own destruction.

The well-known association of suicidal mania with religious melancholia seems to have led other observers to conclude that the influence of the Mohammedan religion may be a factor in the causation. But although amok has made the Malays and their descendants notorious all over the world, it does not appear to have affected the millions of Mussulmans in Turkey, and most other Mohammedan countries. The victims generally fall quite independently of creed, nationality, or relationship. And, although a good deal of religious fanaticism may be induced in the melée, I do not think from what I know of Pahang Malays that the pure Mohammedan religion has anything to do with amok. The religion of the Malay native is, speaking generally, made up of a superstitious and very conservative belief in old charms and magic as well as public worship at the mosques and high places.

As far as the unpremeditated murders of amok go I think that the laws of the Koran relating to murder clearly support the opinion, except perhaps in some cases of "false amok." I doubt whether the ordinary Pahang villager has ever studied these laws, but the question seems to be of little importance, because doubtless Malays have been carried away by the blind passion-of amok long before the comparatively modern conversion of the race to Mohammedanism. Indeed the occurrence was much more prevalent in the old days, and as Mr. Clifford says in his Dictionary, the advance of civilisation has done much to repress this peculiarity of the Malays, and amok running is becoming yearly more rare.

The mental upheaval of amok has some of the clinical features of epileptic mania. There is impulsiveness, violence, homicide, and destructiveness. Mr. Clifford notes that a man who runs amok may purposely collect and destroy his most valuable possessions.

It seems to resemble also very closely the automatic condition left after an epileptic fit, more particularly the so-called "procursive" or "procursine" epilepsy, in which the patient starts to run. To "run amuck" is a universal expression.

The red vision, or field of blood, which has been described in some cases of amok, is also significant of an epileptic aura, but there seem to be no motor or visceral aura.

Although, according to Trousseau (Trousseau's Clinical Medicine," vol. i., p. 67), Mohammed himself was said to be an epileptic, I have not yet seen or recognised either petit-mal or haut-mal in Pahang Mohammedans, nor the more or less regular manifestations of epileptic larvee.

There is no history of Man having had fits during childhood, and he has had none of the ordinary signs of epilepsy since he has been under observation.

At his trial, on October 8, 1900, he was judged to be insane chiefly on account of the fact that he had loss of memory, which, coupled with the pre-vious history of delusion and hallucination, was sufficient to allow that he had been unconscious of his actions when he ran amok.

The demeanour of the prisoner in Court was curious—he was no longer depressed. His spirits seemed to rise and he was almost excited at times; he had loss of memory for names of places, and was evidently not alive to the fact that he was being tried for his life. He was transferred to the Selangor Asylum on November 29, 1900.

The future history of this case will be of great interest. It may supply material for reflection with regard to the recurrence of symptoms which sometimes occur in amok, and thus prove of general

as well as special interest.

#### NOTES ON INTESTINAL WORMS IN NATIVES OF BRITISH CENTRAL AFRICA.

By C. W. DANIELS, M.B.

THERE is considerable difficulty in obtaining a large series of stools from natives of this part of Africa, as they are suspicious of things they do not understand.

Most of the examinations recorded are of the stools of adult males. The stools were examined for the ova, the worms were not looked for.

The list includes only unselected cases, any results in selected cases are mentioned separately.

TABLE SHOWING THE ENTOZOA FOUND IN NATIVES IN BRITISH CENTRAL AFRICA.

ed: to with	8	NUMBER WITH							
(	Number of Stools examined	Anchy-lostomes	Lumbrici	Tricocephalus	Anguilulla	Bilbarzia (Rectal)			
Shire Highlands	83	2	10	4					
Angoni Highlands	26	2	2	9%					
M'langi Highlands	6		- 2	1					
Lake Shire (Nyassa)	62	12	2		2	·			
Upper Shire River	48	`\-1	1	1	3.5				
Lower Shire River	26	8		, 1, .	1	1			
Total	251	25	15	7	3	1			
Percentages	210	10.8	6.5	3	1.3	443			

The figures show a small infestation by intestinal worms as compared with other tropical countries.

In British Guiana, amongst male adult negroes, 36.5 per cent. have anchylostomes, 25 per cent. lumbrici, and 16 per cent. tricocephalus dispar; and amongst the Indian immigrants 65 per cent. have anchylostomes, 21 per cent. lumbrici, and 13 per cent. tricocephalus dispar.

In Zanzibar, out of 35 examined, anchlostomes were found in 7, lumbrici in 8, and tricocephali in 8.

At Mombasa (British East Africa), out of 30, anchylostomes were found in 8, lumbrici in 1, tricocephalus in 2, and tænia (saginata?) in 2.

The parasite to which most interest is attached is the anchylostome, and it will be observed that not only is the percentage low as compared with British Guiana or India for the whole series, but also that in the Highlands it is much more so.

As a rule very few eggs were found, but in some cases selected on the Lower Shire, on account of anæmia, they were present in considerable numbers.

Anæmia is a very rare disease in the Shire Highlands. During the year 1899, Dr. McVicar informs me that out of 324 in-patients admitted there was not one of this complaint, and that it was very rare amongst the out-patients.

It is not a cause of rejection of recruits or of

invaliding amongst the native armed forces.

The cases of anæmia I saw amongst the natives were not marked, and were usually associated with bilharzia hæmatobia, but in three of the most marked examined on the Lower Shire, abundant anchylostome ova were found in each.

The other entozoa call for little remark. presence of anguilulla was not associated with any symptoms nor was the case of rectal bilharzia in the list, though in another (selected case) there was blood and mucus, and it had been diagnosed as dysentery.

Nearly all the cases of dysentery examined were associated with amœba coli, and this parasite was

not found in any of the other stools. No new entozoa were found.

Tape worms are said to be fairly common both on the Lower Shire and at the north end of Lake Nyassa, but I was not able to obtain specimens.

Bilharzia as a cause of hæmaturia is common in all districts, but vesical calculus is said to be unknown.

#### AN EASY METHOD OF MOUNTING MOSQUITOES.

By I. CROPPER, M.B., B.C.

Some time ago, medical men residing abroad received instructions from the British Museum for securing and mounting or setting mosquitoes. I am afraid that the response was very small, and mainly for two reasons—we had not the apparatus, pins, &c., nor were most of us entomologists in even the narrower sense of the term. I write now to suggest a simple and effective way of doing the above. All that is necessary is a number of pieces of "leather board," i.e., brown cardboard of which boxes are made, of the size of a microscope slide,

3 in by 1 in, punched with a gun-wad punch fiveeighths in diameter. These can be easily fixed to slides by glue or Canada balsam. A second glass slide fixed to the other side of the cardboard slip makes the whole complete. It can be fixed by a gummed label (or otherwise), and on this details of capture, date, &c., can be noted. The mosquito could be fixed to the glass by a minute drop of Canada balsam or by the tips of the wings. In this way the whole mosquito is readily available for inspection. In the above I have adopted suggestions from both Dr. Manson and Major Giles, I.M.S., who kindly advised me in the matter. As suggested by the latter, a little creasote brushed over the edge of the cardboard slip would prevent mould. Entomologists will of course prefer pinned specimens, but it is not likely that those who have never pinned even a small moth, would find it possible to succeed with mosquitoes without a great deal of practice and time.

I have shown the above to Dr. Manson and Dr. C. W. Daniels, who think well of it, and I trust that those who are interested in the study of malaria

abroad will find the method useful.

The slides complete (if thin "slips" are used) will pack safely in one of the post-boxes supplied by the opticians, and Messrs. C. Baker, of 244, High Holborn, will supply cardboard slips, if desired, at 5s., or, if fixed to slides, at 15s. per gross.

#### THE PREVALENCE OF PINTA ON THE GOLD COAST.

By OSBORNE BROWNE, M.B., C.M.

Dr. EDGAR (JOURNAL OF TROPICAL MEDICINE, 1901) and again Dr. Buchanan (JOURNAL OF TROPICAL MEDICINE, April 15, 1901) both allude to pinta as a disease of Tropical America. I found it very common on the Gold Coast where the natives erroneously attribute it to yaws, although the latter disease may have occurred years before the pinta. At first it begins as a very itchy dark bluish or black spot as a rule on the back of the hand or dorsum of the foot; although it not so unrarely extends to the palms or soles. the disease has gone on for a considerable time it has lost its initial dark colour at all events in places, and is succeeded by a greyish pink or white colour denoting a loss of the natural pigment of the skin. From conversations with natives it was said by them to extend into Hausaland about Kano, where it is called tungere. The fungus is in all cases identical. Natives may also lose the pigment from their skin by a burn, wound, or old parasitic diseases (including pinta) long since died out.

GEOGRAPHICAL DISTRIBUTION OF DISEASE .- It will be observed at page 194 that Dr. Preston Maxwell states that scarlet fever, diphtheria, and rheumatic fever are not met with in the Changpoo Valley of the Fokien Province of China; chronic granular kidney and rickets are practically unknown; chorea and Charcot's disease are never seen; and endocarditis is the rarest of affections.

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BLACKWOOD recommends the administration of euquinine instead of quinine in fevers of various origins, and considers it especially adapted for the use of women and children. He has given it with the most favourable results in doses of 1.8 grs. evoking any discomfort, though, as a rule, smaller doses suffice (0·1 to 0·3 gr.), as euquinine in its effects is twice as strong as quinine. It is best taken in milk, broth, malt extract, or wine.

,							,
Sweating of Feet :							- 1
Balsam Peru						15	min.
Formic Acid						1	dr,
Chloral Hydrate						1	dr.
Alcohol				to n	nake	3	oz.
Apply by means of ab	sorb	ent cot	ton.				
In Malarial Anami	a:						
Iron and Quinine	Cita	ate				1	dr.
Capsicum						2	grn.
Ext. Taraxacum				to r	nake	12	pills
One pill after each me							-
Arsenous Acid						- 1	grn.
Euquinine						30	grn.
Dried Iron Sulph						40	grn.
Strychnine Sulph						1	grn.
Make into 20 pills.	ne t	hree ti				•	
In Pernicious Anan				•			
Arsenous Acid				-5		1	grn.
Ext. Nux Vomice	a	•		1000		10	grn.
Hemogallol							
Mucilage Acacia			:				-
Sugar				tor	nake	60	Pills
Two three times daily				,			
Antiseptic Dusting			•				
Salal	I ow	uer .				4	dr.
Salol Zinc Sulphate	••	••	•••		•••		dr.
Powd. Benzoin	••	••	•••	• • •			dr.
Powd. Talcum							dr.
Oil Fennel							
Thoroughly triturate	unt	1 . 4-	o now				
freely. Of use in treat	mont	of chi	onie n	loare	nd en	in mili	rating
sores, as an iodoform su	hatit	nto cui	onic u	TOOLS O	illu su	PP.	corre
	IDSUIT	uue.					
Cholera Morbus:							ent at
Very hot turpentine	stup	es, cons	sisting	OI B. T	Hores	poon:	IUI O
turpentine oil to the qu	art c		r; and	intern	any:		
Comp. Spt. Ethe	r	9				•	J.,
Comp Spt Lave	nder			of	each	2	dr.

Comp. Spt. Lavender | Campb. Tinc. Opium Tinct. Capsicum ... Tinct. Ginger ... 15 min. One-half to one teaspoonful every two hours.

Merck's Archives, May, 1901.

Whooping-cough in Rangoon.—We are indebted to Lt.-Col. Oswald Baker, M.D., Physician to the Seamen's Hospital Society, for the following communication and comments :-

A Rangoon newspaper states that: "On the recommendation of the P. M. O., Rangoon, the schools in Cantonments have been closed for all children under 10 years of age during the present

prevailing epidemic of whooping-cough."

Lt.-Col. Baker remarks that: "With respect to the enclosed extract, cut from the last Rangoon newspaper to hand, it may interest your readers to learn that this is, I believe, the first occasion within recent times in which whooping-cough has occurred in Rangoon in an epidemic form. That epidemics of the disease may have prevailed in years gone by is possible, but it is my firm conviction that there has not been any previous epidemic outbreak of whooping-cough in Burma within the last twentyfive years."

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94. The address of the Journal of Tropical Medicine is Messrs. Bale, Sons, & Danielsson, Ltd., 88.89, Great Titchfield Street. London. W

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THE

# Journal of Tropical Medicine

JUNE 15, 1901.

#### THE PERSISTENCY OF PLAGUE.

Hong Kong is now passing through a severe recrudescence of plague, the seventh definite outbreak within eight years. Since the spring of 1894 the colony has had a recurrence every year except during 1895; nor does the virulence of the disease abate, for the present epidemic seems the most fatal of all. Over a thousand deaths from plague are already reported for this year, and the disease is only just attaining the maximum of its fatality. Regarding plague and its tenacity of place we naturally turn to Hong Kong for guidance; this being the first place in the world where the present paudemic of plague was brought to the knowledge of a European community. But whether it is Hong Kong, Bombay, or any of the large towns in the Bombay district, the persistency of plague has proved itself a factor in the disease, which thrusts itself upon

the inhabitants of any infected city in a manner which can be regarded as little short of appalling. From what is known of plague, by its behaviour in Hong Kong, we must expect when once a town is infected, that recurrences are not only possible but that they will continue with an inveterate persistency rendering the future, from a public health and a commercial point of view, gloomy in the extreme. In past centuries the same lesson was keenly brought home to us, for the last time plague visited London it lasted some seventy years. We had hope that modern sanitation would have stayed the disease and arrested its continuance; but this hope seems a broken reed as far at least as Asiatic cities are concerned. In Hong Kong we have a city built upon a hillface, with a pure water supply, with the most modern forms of drainage opening into a harbour swept by strong currents, and with the sanitation of the town carefully inspected and attended to under European supervision. With all these advantages Hong Kong is in no better position as regards recurrences of plague and their virulence than is any one of the adjacent Chinese towns and villages. In Bombay the adaptations of modern sanitary principles have been adopted and applied, yet plague retains its hold in as virulent a form as in any village in the semi-desert regions of Rajaputana.

In explanation of the malignant pertinacity of the recrudescence in Asiatic cities it had come to be believed that the natives of China and India were peculiarly susceptible to plague, and that Europeans, owing to their more sanitary ways of living, were well nigh immune. This belief is, however, not founded on fact. In Capetown at the present moment the Europeans are suffering from plague in almost equally proportionate numbers to the coloured people. The number of seizures and deaths amongst Europeans in Capetown has exceeded that of any other town in which Europeans and coloured natives exist side by side. But Capetown is peopled by men and women from many countries, and of all the immigrant or native communities in Capetown, the Chinese, who are in considerable numbers, have suffered least from plague. soft a se Eife.

Next to the Chinese in immunity range the Malays; so that although two typically oriental peoples are dwelling in the midst of a British community, they are practically free from a disease which has hitherto selected orientals as its victims, wherever inhabitants of Europe and Asia dwell together. Racial immunity and racial incidence seem to play no part in the onset of plague, household and personal cleanliness would seem to have little to do with the spread of the disease, nor can public sanitation claim that it has done much to thwart plague in its virulence or in its spread.

The dread of plague reaching a country after a study of its behaviour in Hong Kong and elsewhere is well grounded, and it behoves the sanitary authorities, both in the east and west of Europe, to keep strict watch upon their frontiers and shores, for plague once admitted is no respecter of race or locality, and it would seem to defy the efforts of all public health measures to eradicate its ravages or prevent its recurrences when once it has become established.

## Translations.

#### FRAMBŒSIA TROPICA IN SUMATRA.

By Dr. L. MARTIN.

(Translated from the German by P. Falcke.)

It is only of the least specific of the tropical diseases that German literature furnishes exhaustive histories, yet such histories are full of interest, and give the tropical practitioner a more distinct picture of the affection than the most minute essays in the best handbooks.

Working from this standpoint, the practical sparsity of which I have so frequently deplored, I will communicate the cases of frambæsia tropica which came under my observation during the course of a year (from April 1, 1899, to April 1, 1900), in the coolie hospital, "Bangkatan," under my charge, and situated in Bindjei, Delni, on the east coast of Sumatra.

Case 1.—A Javanese, Mentowikromo, 25 years of age, had been in Sumatra for three years, and was a coolie on the tobacco plantation, Kwala Minchirim. He was admitted to the hospital on December 18, 1899. He asserted that in his native island, Java, he had already suffered from "patek," a statement that was confirmed by the presence of various dark pigmented scars. Both his parents, as also a younger

brother, had had the same ailment; he denied ever having had a venereal disease; there were no cicatrices on the genitals, but the inguinal and crural glands were enlarged. His present illness had developed fourteen days previously without apparent cause. One morning on going to work he had pains on the soles of the feet, every contact with the hard ground, with small stones, even with the sward, being painful, so that, at the present time, he is quite incapacitated from walking or working. The patient otherwise is quite healthy, has no fever, his appetite normal. On the sole of the foot, in three different places, i.e., the dorsum of the big toe, the ball of the big toe, and in the arch of the sole of the foot near the outer border, there are seen irregularly shaped, raspberrylike papillomata, which overlap the surrounding skin by about 1 cm.; they bleed readily, and are surrounded by pus and macerated epidermis. These papillomata on being pressed retire beneath the partly undermined loosened layers of the cracks; the odour is fætid, but by no means specific. After cleansing the foot, which is much begrimed with soil, with a solution of sublimate, the epidermis around the papilloma is removed by means of the curved scissors as far down and as deep as possible; the same is done with the free papillomata, the bases or pedicles of which, moreover, are energetically treated with the sharp spoon without, however, evoking much bleeding. It is then seen that the flattened papillomata extend deep beneath the undermined epidermis. As this operation is fairly painful, the foot of the patient, who is recumbent on the operation table, is to be firmly held by hospital assistants. After styptics have been applied to the flat ulcerative surface, it is macerated with a 3 per cent. alcoholic solution of sublimate on a pad of medicated wool of the same size as the ulcer, a piece of lint streaked with unguentum cinereum is applied, then a layer of dry wadding, and a bandage of cambric. The bandages, &c., are changed every other day, and on December 29 it is found that two ulcers are quite healed, and the one on the edge of the foot exhibited a smooth, clean, granulating surface about the size of a penny. The pain had completely disappeared, and walking was possible. On January 1, 1900, the last ulcer had cicatrised, but as the scars were still soft and tender, the patient was retained in the hospital, his foot being kept bandaged until January 4.

Case 2.—A Javanese, Tomis, 35 years of age, who has been nine years in Sumatra, a coolie on the tobacco plantation, Kwala Minchirim. He was admitted to hospital on December 18, 1899. He states that while still in Java he had suffered from "patek," his mother, sisters and brother having also had the same ailment. He denies ever having had a venereal complaint, but the inguinal and crural glands are distinctly enlarged. A fortnight ago, and from no cause whatever, the present affection had revealed itself, and made it impossible for him to walk on account of the severe pain on the soles of the feet when touching the ground. Patient otherwise is quite healthy, is of robust appearance, has no fever,

and an excellent appetite.

On the sole of the right foot, on the ball behind the fourth and fifth toes, and on about the middle of the

heel, there are raspberry-like papillomata of longish, irregular shape, which have forced themselves through the thickened, half-macerated epidermis, which is discoloured to a whitish hue at the places of contact, undermined with pus and of a feetid odour. The papillomata protrude about 0.5 cm. over the healthy skin. The same treatment and similar bandages as in Case I are adopted, and in this case also the removal of the scales of epidermis reveals radiated flattened processes of the papilloma. The patient was discharged on January 1, 1900, entirely cured.

Case 3.—A Javanese, Tirtowongso, 35 years of age, has been in Sumatra eight years, is water-carrier to Mr. K.; admitted to the hospital on January 13, 1900. He states that in Java, as a child as also when grown up, and later on also in Sumatra about one and a half years previously, he had suffered from "patek." He had no recollection as to whether his parents had had the disease, but remembered that his brothers

suffered from it.

With the exception of gonorrhœa patient had no venereal history; on the penis the cicatrix of the operative incision is remarkably distinct, the inguinal and crural glands are enlarged and the cicatrix of a bubo is apparent over the left crural gland. Ten days ago the present ailment came on, without his being able to ascribe a cause. Patient, otherwise well and hearty, exhibited on the sole of the left foot a roundish opening of the thick-fissured epidermis, about the size of a five-shilling piece, taking in nearly the whole of the heel; its edges were undermined and filled with disintegrated débris of epidermis and particles of earth and emitted a disagreeable smell reminiscent of sour, clotted milk. From the hole thus formed there emerged a smooth, roundish, raspberrylike swelling about 1 c.m. in height, but which nevertheless had not excoriated and did not bleed. A similar but smaller elongated swelling was to be seen under the ball of the foot. The corneous, thickened epidermis was removed from both ulcerations as far as possible, revealing a peculiar zig-zag formation of the epidermis, reminding one of the horn of a stag, or the formation of coral; it had not deliquesced and stood out pure white from the surrounding detritus. This appearance, which is characteristic of frambœsia, was also cut away with the scissors, detritus and raspberry-like prominences thoroughly removed, and the surface of the wound, which was considerably larger than the originally perceptible papillomata, treated and bandaged as Case 1.

After continuing the treatment and changing the bandages every other day, the patient was discharged from hospital, cured and capable of work, on February

1, 1900.

Case 4.—Javanese, Signotono, aged 30, has been in Sumatra four years, is coolie on the tobacco plantation, Poengei; admitted to hospital March 2, 1900. He states that he has had "patek" on his left hand for six weeks, has never had the illness previously, and can remember no case of the same in his family. He denies having had any venereal disease; there is no cicatrix on the penis, but the inguinal, as also the cervical and axillary glands, are distinctly enlarged. On admission there is found a raspberry-like swelling, the size of a dollar, in the palm of the left hand, at

the base of the third finger; this extends beyond the edges of the fissured epidermis, is covered with pus, and emits a foul odour. Another swelling of a similar size, clean but still very prominent, exists on the extensor aspect of the right wrist. The patient besides is suffering from a common, granulating ulcer on the shin of the right leg. Both papillomata were treated as above and bandaged, and on March 15 were completely healed, whereas the leg ulcer follows the usual chronic course, and on April 4 is still the size of a finger nail. On March 29 and without any prodromal symptoms, a secondary frambæsial eruption broke out on the face, and there were sixteen small papillomata, varying in size from a lentil to a hazel nut, on all parts of the face; these resembled condylomata, but disappeared quickly under the above method of treatment, i.e., removal with the scissors, cleaning with 3 per cent. solution of sublimate and inunction with unguentum cinereum. Iodide of potassium was administered internally.

CASE 5.—Javanese, Kromosora, 40 years of age, has been in Java twelve years and is employed as coolie on the tobacco plantation of Kivala Minchirim, Admitted to hospital on November 11, 1899, where he had previously been under treatment for frambæsia of both feet from June 7 to July 4, 1899. On that occasion he had been laid up for a month before he came to hospital for treatment, and on this occasion he had already suffered from the illness for a month. On the left leg there are two prominent papillomata of irregular shape, raised about 1.0 or 1.5 cm.; one on the outer side half way up the leg, the second in the middle of the calf. Treatment and bandaging as in Case 1. The patient was discharged cured on December 23, 1899.

Cases 6 and 7.—Javanese, Kassandarmo, 35 years of age, has been six years in Sumatra, and Alibesari, 25 years of age, has been one year in Sumatra; both are coolies on the tobacco plantation, Tandjong Djatti. The former had been ill a fortnight, the latter a month; they received the same treatment in hospital with the same result. In Kassandarmo the papillomata were on the leg, and in his case there had doubtless been syphilitic infection. Alibesari exhibited the usual frambæsial swellings on the sole of the foot.

The above seven cases are the only examples of frambæsia tropica or polypapilloma tropica which came under my treatment during a whole year, from amongst a total of 1,353 Chinese, Javanese, and Tamils. It will therefore be seen that the affection is a relatively rare one amongst the native workers on the tobacco plantations on the west coast of Sumatra, and seems only to come under observation amongst the Javanese. Notwithstanding the great number of Chinese-about 3,000 came under treatment at the hospital, Bangkaton-who were in daily intimate connection with the Javanese and their wives, and who always went barefooted in their daily life and in the field, no Chinese coolies suffering with frambæsia ever came under observation, nor did Europeans; the latter, however, are protected from infection, which mostly attacks the feet, by always wearing shoes or slippers. It was also found that no further infections ever originated from the cases admitted to hospital; it will be distinctly seen from the history of disease imparted by

the patients that infections often occurred from member to member of one family owing to the intimate

connection of their family life.

There is no doubt, however, that if the Javanese and Malayan villages, the inhabitants of which rarely come into contact with European doctors, were examined, far greater numbers of persons suffering with frambæsia would be found. The disease is a purely local one, has no prodromal symptoms, and causes no general indisposition, for all my patients

rejoiced in the most robust health.

The Javanese, when the affection is localised on the sole of the foot, call it "bubul" and otherwise "patek" ("paku" in Soudanese). Though bubul affects walking and therefore labour, it does not call for much attention, the persons affected recognising that it is a purely local affection without general symptoms. They, however, assert that pains in the bones (sahkit toelang) set in if the bubul or patek does not break out. They treat the papillomata exclusively with frequent paintings with sulphate of copper; this inefficient treatment causes the sufferers much pain, and the places only heal after months of treatment.

The seven patients were all comparatively young, between 25 and 40 years of age, but there is no doubt that most of the illnesses take place at a much younger age, the age of childhood. I distinctly remember that when passing Javanese or Malayan settlements I always remarked several sufferers from frambæsia amongst the crowds of romping children. In children the face and hands are more frequently the seat of the disease than in adults, whose legs and the soles of whose feet—the latter in quite a typical manner are generally attacked. In the face the papillomata are certainly seen on the border of the skin and mucous membrane, but I have never been able to confirm the same on the mucous membrane itself, nor on the anus; on the latter locality it is doubtless a question of condylomata, never of frambæsia. When the complaint is localised on the sole of the foot, the papillomata visible externally never correspond with the actual extent of the affection, and operative treatment bears evidence that great mistakes may be made in this particular. As the sole of the foot amongst barefooted people acquires an enormously thick corneous layer, the suppuration, which produces the papilloma originating from the papillary bodies, is not able to disperse the masses of epidermis, loosened patches remain intact, and beneath these nests of flattened papillomata are formed, and thus is originated the typical coral-like formation described above in the histories of cases, and which consist of branches of corneous layers, as yet not dissolved. In order to bring about complete recovery, all these concealed agglomerations of papillomata, which are radiated, fissured processes of the principal visible swelling under the intact epidermis, must be completely removed, so that treatment is possible, and though the operation in itself is simple in the extreme it is a wearisome one, requiring the exercise of patience by both surgeon and patient. This explains why the treatment of the Javanese with copper takes so long; it stands to reason that here only the visible part of the frambæsia is cauterised, and months elapse before the processes of papillomata

hidden beneath the corneous layer a cm. thick are laid open and can be treated. Generally some fine mud, originating from the roads softened by rain; penetrates beneath the epidermis by mean's of the perforations formed by the principal papilloma; this is exhibited as a thin black coating under the epidermis, loosened by the papillary processes and undermined by their sections; on the line of section the mud has the appearance of a black linear border. Where this border is to be seen one may with safety continue to remove the epidermis, for papilloma wiff certainly be found there.

The frequent relapses of Javanese may partly be explained by the fact that, whereas the superficial papillomata are cured by treatment, a few more deeply situated centres continue to exist, and only after weeks or months break through the cutis in their turn, and superimpose a fresh illness. The conditions in "patek" are much simpler, the papilloma in their whole extent being laid open, and only in the palm of the hand can conditions similar to those on the soles of the feet, but

to a less degree, prevail.

A further difference between bubul and patek is that in the latter the swellings are relatively much less tender than in bubul, where, corresponding to the region of the nerves of the sole of foot, the ailment is a very painful one. The slightest pressure on the papillomata of the feet induces an immediate severe pain, and walking therefore becomes an impossibility.

Patients with bubul on their heels have to walk on tip toe. I could not confirm the statement that a specific cdour is attached to this complaint; the cleansed papilloma had no odour at all, whereas those that were surrounded by detritus, half-melted skin and particles of soil, only had the usual fœuid smell which is also perceptible in onychia, caries, &c. The lymphatic glands, particularly the crural and inguinal glands, showed themselves enlarged and infiltrated, and in all cases where the localisation was in the hand the elbow glands were likewise affected. If, in the cases cited, it was a question of frambœsia itself, or a previous infection with lues, and in the case of children of inherited syphilis, it is very difficult to decide. The coolies coming under treatment did not belong to the best and most moral classes of Javanese; they came from ports more or less soaked with syphilis, so that the possibility of a previous infection with syphilis cannot be excluded. Suppuration of the lymphatic glands cannot be confirmed; in any case the buboes observed may be attributed to a simultaneous infection with streptococcus or staphylococcus.

The cases instanced further teach us that in frambæsia frequent relapses are the rule, and that one recovery from the illuess by no means provides protection against new eruptions. Nearly all the patients had suffered formerly from the complaint, and Kromosaro (Case 5) had two eruptions in one year. Serious consequences such as gangrene and caries have been mentioned by various authors, but personally I have never seen any. The remaining cicatrices were always deeply pigmented; in the Javanese they were blackish brown, while white cicatrices without pigment belong to the region of lues. As to the prognosis of the affection, it is, as Scheube with justice says in his

handbook Krankheiten der warmen Länder, a favourable one. Nevertheles I do not regard the illness as capable of spontaneous recovery, for to attain this months or even years must elapse, owing no doubt to the uncleanliness and bad habits of the natives. The patients whose cases are here given had, one and all, suffered with the complaints for some time previous to their admission to hospital (from ten days to six weeks), and they would not have sought European aid if their own methods had not failed. It need not be further discussed what consequences may follow if a Javanese with a frambæsial swelling on the sole of the foot neglects it, but it is possible it may prove fatal. The average duration of hospital treatment is about three weeks, this period including the rest that is requisite for the hardening of the cicatrices.

The diagnosis in typical cases presents no difficulties, but the suspicion of co-existent lues (tertiary or congenital in children) must always be taken into account, and the absolute exclusion of syphilis amongst the people of the coolie class cannot be relied on. This suspicion is always strengthened by the application of the above-mentioned treatment, and besides, all authors coincide as to the curative influence of the continuous administration of iodide of potassium, and this treatment was always followed in Bangkaton Hospital. The removal and scraping out of the frambossial swellings is always very painful, and the Javanese individually vary in their sensibility as to pain. Whereas one man hardly moves a muscle when under operation, another man must be placed under an anæsthetic in order to thoroughly carry out the treatment necessary for the cure. - Archiv für Schiff und Tropen Hygiene, June, 1901.

# THE PURIFICATION OF WATER IN CAMPAIGNS.

MAJOR W. G. MACPHERSON, M.B., draws attention to the difficulties of the purification of water during campaigns, in Public Health for June, 1901. The recent modifications, which have been lately advanced, consist chiefly in the method of biological sterilisation in contradistinction to the older method of oxidation of the organic impurities. During war the means and methods of purification must be of the simplest possible character, so that time, carriage and expense may be saved. It is evident that plans of purification of water for cities and stationary hospitals are, for the most part, inapplicable at the front. It must also be remembered that there are usually two factors to be considered in purifying water, namely, sterilisation and clarification, and the ideal method of purification is the one which combines these processes. The several known methods come under one of three headings, namely, boiling, the use of chemical agents, and filtration.

(a) Boiling.—Simplicity and efficiency commend boiling as a means of dealing with suspicious water, but the means of carrying it out at the front are seldom at hand. The impedimenta necessary to ensure efficiency by this method, such as apparatus, fuel, &c., are insurmountable obstacles to its use, and

the time which must elapse before the water is fit to be consumed is a great drawback. Special apparatus designed to economise fuel, to rapidly cool the water, and to boil without the loss of the dissolved gases in the water have been manufactured and tested practically. Of these the best known are the (1) Villiard-Desmaroux, (2) the Maiche, (3) the Waterhouse-Forbes. None of these however, clarify water, and until this can be combined along with purification by heat, perfection of water purification cannot be said to be obtained.

(b) Sterilisation by Chemical Agents.—The difficulty in the application of sterilisation by chemical agents lies in the production of an agent which is at once reliable, innocuous, and tasteless. Permanganate of potash has long been used as a prophylactic against cholera, but it is an inefficient germicide for bacteria of most other diseases. Of other methods the best known are: (1) Lepeyrère's, which consists of permanganate of potash combined with alum, and the carbonates of sodium and calcium. (2) The Austrian method, in which the hypochlorite of calcium (.02 gramme to a litre of water) is used. (3) Bergé's, of Brussels, method by peroxide of chlorine; for which it is claimed that the water is sterilised, clarified, and produced without affecting the taste. (4) Schumberg's method by adding bromine (.06 gramme to the litre) to the water. The unpalatableness incident to the use of bromine is remedied by the addition of small quantities of hyposulphite and carbonate of sodium. This method was tested on a large scale during the Soudan campaign, and the chief disadvantage accruing to the method is the time it takes. (5) Parkes and Rideal claim to have discovered a reliable germicide in disulphate of sodium. Seeing that this salt can be made up into tabloids ready for use, its efficiency is

enhanced thereby.

(c) Filtration.—The chief objection to filters is that they get choked by muddy water. This has been greatly obviated by the addition of the air-pressure chamber in the Berkefeld Field Service filter, which has rendered the filter very reliable as a sterilising filter. There is no doubt that purification by the single-bougie pressure filters is best suited for the individual soldier, and if they are carefully used and cared for by men trained to look after them, meet most of the requirements during war. For general garrison purposes the "many-bougie filters" are best adapted. Major Macpherson remarks that the use of chemical methods by individual soldiers can never be generally applied with any prospect of success, and that for this as for every form of purification it is necessary that the individual officer and men be instructed in the principle of water purification, and in the practical use of some one or more methods.

Unfortunately, the great scourge of armies—enterior fever—is spread by other means than by drinking water, and that, although the purification of water is no doubt the chief goal to be aimed at, there are other lurking dangers to be combated whenever and wherever soldiers are brought together into hastily constructed camps, or when the exigences of war curtail the more elaborate necessities of sanitation.

#### MASSACHUSETTS GENERAL HOSPITAL.

#### THE OCCURRENCE OF FILARIA AND ELE-PHANTIASIS IN SOUTH CAROLINA, U.S.A.

DR. H. F. VICKERY showed a case of elephantiasis of moderate degree in a mulatto woman who was born in South Carolina, and was seventeen years old when she entered the wards last September. She came in on account of symptoms which were easily explained by a marked chlorosis which she had, the hæmoglobin being only 50 per cent. of normal; but the object of interest to us was her right leg, below the knee and including part of the foot. The leg was symmetrically enlarged; the hair follicles somewhat farther apart than on the normal leg, and the hairs rather more luxuriant. The enlargement was apparently due to hypertrophy of the skin and the subjacent connective tissue. The X-rays showed no difference in the bones. The case was seen by Dr. Bowen, who agreed with me that it was a sort of elephantiasis.

True elephantiasis of tropical origin is due to the presence of the Filaria sanguinis nocturna, although the filaria cannot, as a rule, be found in the general circulation in these cases, being confined by the choking up of the lymph glands of the diseased part with the eggs of the filaria. Repeatedly the blood of this patient was examined day and night, both from the leg and from other parts, but no filaria was discovered. Unlike cases of ordinary elephantiasis, she never had any erysipelatous attacks in the leg. This leg measured the same size as both her thighs, nearly 41 centimetres.

Dr. White said: It seems to me that the case is one rather of false than true elephantiasis due to the presence of filaria. The occurrence, in the early stages of the latter, of attacks of erysipelas-like dermatitis are almost constant, and I was not aware until Dr. Vickery so stated that this filaria is found as far north as South Carolina. These sporadic cases which occur in northern regions are looked upon rather as non-parasitic, and are called false elephantiasis on that account, due to some condition of the lymph vessels, not a mechanical stoppage by the filaria, but to other processes which lead to precisely the same results.

#### MOSQUITOES COLLECTED IN HONG KONG DURING THE FIRST QUARTER OF 1901.

REPORT BY DR J. C. THOMSON, M.A., M.D.

From the majority of the various police districts into which the Crown Colony of Hong Kong is divided, specimens have been regularly sent for examination during the months of January, February, and March, 1901. In all, some 7,490 mosquitoes have been received and examined, and the numbers as regards the proportion of Anopheles to Culer mosquitoes proved respectively to be 227 (3 per cent.) and 7,263. For the three months the numbers of Anopheles were, for January 143, February 35, and March 49. These numbers coincide in their rise and fall with the prevalence

of malaria in the colony, for during either February or March in most years the cases of malarial fever reach their minimum. The Anopheles found could all be apportioned under two species, and the Culer were found to belong to five species.

Dr. Thomson adds some useful hints as to collection. The mosquitoes should be caught by means of glass test tubes and killed by a few whiffs of smoke. No packing of any kind is necessary other than the wrapping of the box in a piece of paper. Mosquitoes should be examined within twenty-four hours after capture, as after that time they become dry, they tend to break up, and classification of them is less satisfactory.

# TRINIDAD—ANNUAL REPORT OF THE SURGEON-GENERAL FOR 1900.

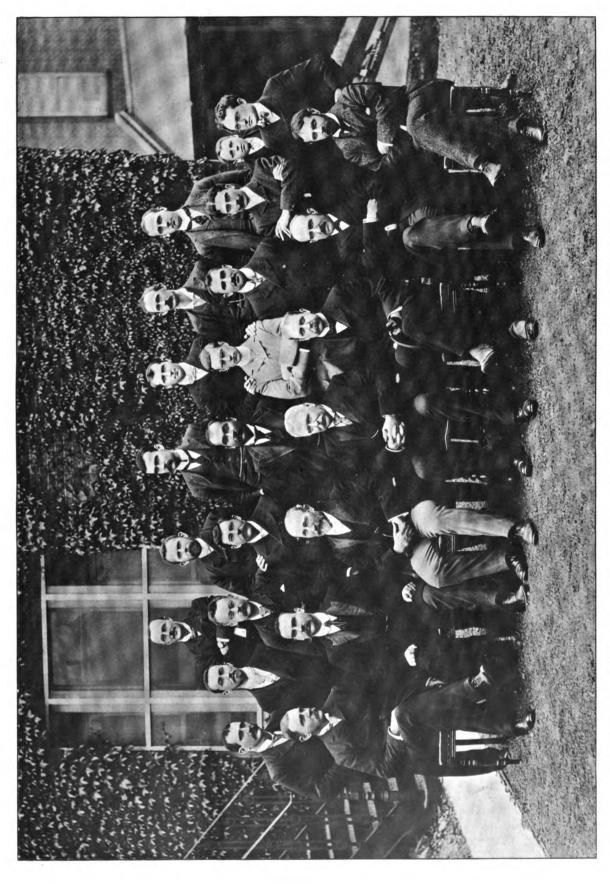
The report by Sir Francis Lovell, C.M.G., and the medical officers in the Government service in Trinidad and Tobago, W. Indies, covers 106 folio pages. The completeness and care with which the report is produced is highly creditable to the medical staff, and of great interest from a scientific point of view. The diseases most frequently met with in Trinidad are malaria, dysentery, yaws, anæmia, ankylostomiasis, and "ulcers." Influenza prevailed as an epidemic during 1900, after an absence of four years.

YAWS.

In 1896 yaws had attained so wide a prevalence in Trinidad and Tobago that it was found necessary to introduce a "yaws ordinance." By this ordinance hospitals and dispensaries were specially opened for the treatment of yaws, and the notification of the disease was made compulsory. There were 963 cases of yaws under treatment in Trinidad during the year, and at the beginning of the year under review 767 were under treatment in Tobago.

Regarding the treatment of vaws at the Arima Yaws Hospital, Dr. F. de Verteuil remarks: "The treatment by thyroid extract has been continued throughout the year, and there can be no doubt that this drug is of the utmost value. Under its use the tubercles rapidly disappear and the general health seems to improve. I had to give up the use of guaiacol, as this drug was not well borne by the children, and did not seem to do much good in most of the cases in which it was tried. Of the other drugs, iodide of potassium, mercury, arsenic, &c., are given in suitable cases. But, as I have stated in my former report, strict hygienic rules, a nutritious diet and bathing, are essential in the treatment of yaws. Out of 126 persons treated in the hospital, 95 were discharged as cured, and amongst those latter were ten relapses. I have had frequent occasions of seeing a good many of the persons discharged during 1899 and 1900, and the cures appear to be permanent.

Dr. Charles F. Knox, in his report on the St. Clair Yaws Hospital, remarks regarding the treatment of yaws: "After a trial of several drugs, internally and externally, including guaiacol, thyroial and gland extract, I find the iodides, especially the iodide of



# SOME OF THE TEACHERS AND STUDENTS ATTENDING THE LONDON SCHOOL OF TROPICAL MEDICINE, Summer Session, 1901.

Back Row—A. E. Wynter. A. Klövstad. H. M. Pereira. J. Rocke. C. B. Reid. A. Leathem.

Middle Row—W. E. Godber. G. Reulter. C. J. Davenport. J. M. J. Hotvedt. P. M. Tobit. C. A. Wiggins. A. Sims. A. E. Terzi. E. A. Laytora.

Front Row—Ed. Harvey. Dr. Sambon. Mr. Cantlie. Dr. Manson, C. M.G. Mr. Michelli (Secretary). Dr. Baker. Mr. Daniels.

The following Students not in this photograph are attending the School at the present time:—
W. W. Pearse, C. L. Chevallier, W. J. Stewart, Miss J. Horwood, Y. Ustvedt, W. H. de Wytt, J. M. Falkiner, A. F. M. Berkeley, W. F. Magfarlane, W. U. Thompson.

Bale and Danielsson Ltd., London.



iron internally, with iodoform as an ointment or dissolved in oil externally, quite sufficient to effect a cure in most cases. Some of the cases have proved very rebellious to all treatment, but most of them get cured in from three to four months."

Dr. T. B. Kenny and Dr. R. C. Bennett, speaking of the treatment of yaws, seem to think that the present dispensary system in force, while it helps to keep the disease under, does not serve to eradicate it.

#### DYSENTERY

appears to have been less prevalent than in former years, 589 cases of dysentery only being met with during 1900, out of a total of 23,403 cases of all diseases.

#### WHOOPING-COUGH.

prevailed as a mild epidemic in several districts.

#### CHICKEN POX

is reported as having been met with in the Arima district.

#### HÆMOGLOBINURIC FEVER

is stated by Dr. A. Milner to have occurred in a girl aged 12 years in the Mayaro district. The girl died on the third day of the illness with complete suppression of urine. In the Cedros district also, Dr. C. W. Hewlett states that: "Four cases were reported as blackwater fever, one of them being fatal."

#### GROUND ITCH (PANI GHAO).

Dr. R. Seheult, in his report on the diseases of the San Fernando and Napurima district, remarks: "This disease appears to be identical with the Pani Ghao' or 'water sore' of Assam, and is very prevalent during the rainy season on the sugar plantations amongst the East Indian labourers. The duration of the disease varies from a few days to two to three weeks. Probably the disease is caused by some chemical irritant in the soil, and the manure which is used in the fields may have something to do with its causation, or it may possibly be a parasitic disease. It is not a serious ailment, but it causes a great amount of pain and discomfort to the patients, and is a matter of much importance to the planters, as, it incapacitates so many labourers from doing their work. The question of introducing wooden clogs (Kurrams) to keep the feet off the ground, as suggested by a writer in the Journal of Tropical Medicine, is worthy of consideration."

Dr. J. W. Eakin, in his report on the South Napurima District, also states that he met with ground itch, and makes the following remark upon the nature of this ailment: "The disease appears to me to closely resemble pemphigus contagiosus in its general character, though differing from this latter affection in that it develops on the hands and feet, whilst pemphigus contagiosus seems to be confined mainly to the axillæ. Otherwise the two diseases appear to be identical, and I bring it to your notice in the hope that its pathology may be investigated and its nature defined."

Dr. E. J. Hammond, in the Savana Grande District, states that he met with a considerable number of cases of "ground itch."

#### MALARIA:

Malarial fevers are reported upon as follows: -

	Ma	larial	Fever.			P	Cas	es Trea	ted.
			/Quoti	dian	444			40	
				ın				854	
	(a) Intermit	ttent						-	
*	The second second		Irregi	alar				3	7
			Type	undiagr	nosed			_	
(b)	Remittent							225	
(c)	Pernicious							61	
(d)	Cachexia							53	4

It is interesting to note that the "undiagnosed" type of fevers are nil; this heading stands a good chance of disappearing from our nomenclature in view of the advance made in our knowledge of the parasite.

#### BERI-BERI.

Three cases of beri-beri were treated during the year 1900. The case reported by Dr. R. Scheult was of the "wet variety," and occurred in a European.

#### GUINEA WORM.

In two newly arrived East Indian immigrants guinea worms were found and extracted, one from the leg and another from the buttock of the patients.

#### TYPHOID FEVER.

Under the heading "Prevalence of Disease" on page 4 of the Report, it is stated that of a total of 23,403 cases of all diseases treated, one case only of typhoid fever was met with. Under the reports of the medical districts, however, several instances of typhoid are mentioned.

Drs. Darwent, Kenny, Percy, Seheult, all mention typhoid fever as having occurred in their districts or hospitals, and in the tabulated returns forty-five cases of enteric fever are noted. In no district is typhoid fever prevalent, and considering the state of over-crowding and sanitary neglect that many of the medical officers describe, it seems extraordinary how rare typhus and typhoid are. In fact no case of typhus fever is recorded, and the typhoids are wondrous few. One cannot help balancing the disproportion between the typhoid fever returns and the reported cases of remittent fever. The former number 45, the latter 225. In many British colonies typhoid had been reported as non-existent; but as years went on, the remittent group of fevers steadily diminished, and in proportion the enterics increased.

WE regret to have to announce the decease of Dr. Paul Kohlstock, which occurred at Tientsin, China, on April 15, at the early age of 40 years. He was a valuable contributor to our knowledge of tropical hygiene, more particularly malaria. In 1896 he accompanied Professor Koch to South Africa, and assisted in the investigation of cattle plague and rinderpest in Cape Colony.

## Correspondence.

#### DOG TICKS AND BLACKWATER FEVER.

To the Editors of the Journal of Tropical Medicine.

SIR,—At the time when we sent to you our paper describing certain bodies found in the urine in cases of blackwater fever, it appeared probable that we should be able to examine other eases at a later date. As this does not now appear likely, we write to offer the following suggestion to anyone who may have a case of blackwater fever in his care. Ascertain if the patient has been in close contact with any dog, or in any circumstance in which he could have contracted ticks. In both the cases we reported this had been the case, and on examination of the ticks with which the dog was infected, we found in them bodies which closely resembled, if they were not identical in species with, the bodies found in the urines. We had hoped to confirm the observation before writing of it, but under present circumstances can only offer it as an isolated fact of a suggestive nature.

Yours truly, E. G. Hamilton Williams, Mary Hamilton Williams,

Boreham Wood, May 25, 1901,

#### TYPHOID FEVER IN UGANDA.

To the Editors of the Journal of Tropical Medicine.

DEAR SIR,—In the paper I sent for publication in your paper a fortnight ago, I said that I had not come across any cases of typhoid in Uganda, and the Government P.M.O. agreed with me. Curiously enough, in the last ten days we have done two post mortems on typical cases of typhoid. A smear from the spleen in the first case was crowded with Eberth's bacillus, and the second case was absolutely characteristic, with the usual ulcers, mesenteric glands, &c.

Sincerely yours, ALBERT R. COOK.

Mengo, Uganda, April 11, 1901.

#### Mebichs.

THE DISEASES OF THE THYROID GLAND AND THEIR SURGICAL TREATMENT. By James Berry, B.S.Lond., F.R.C.S., Surgeon to the Royal Free Hospital, London. London: J. & A. Churchill. 1901. Pp. 367, with 121 illustrations. Price 14s.

That a portion of the human body weighing but one ounce should require a book of 367 pages to be devoted to its pathology and surgery is a proof of the advance of our knowledge of disease in general and of surgery in particular. Yet there is not a superfluous sentence in this carefully prepared work. The anatomy of the thyroid gland is concisely and clearly described in the first chapter of the work. To those unacquainted with recent anatomical advance the description of accessory thyroid glands and of parathyroids will prove to them that there is no standing still in even the anatomy of the human body; and if this be true of so an approximately exact science as anatomy, the fact of progress will be brought fully home to them in the perusal of the subsequent pages, Congenital affections, atrophy and hypertrophy are dealt with in Chapters II. and

III. Goitre and its varieties are described in Chapter IV. and beautifully illustrated; and the etiology and geographical distribution of endemic goitre in Chapter V. In connection with this subject Mr. Berry states that goitre has little to do with climate, want of sunshine, carrying weights on the head, heredity, or intermarriage. On the other hand, the author holds that endemic goitre bears some definite relation to a poison in the soil conveyed by drinking water derived usually from calcareous soils, but probably not a salt of lime or magnesia. An excellent clinical picture is given of the signs and symptoms of thyroid enlargements, and of the dyspnœa caused by goitre. Separate chapters are devoted to inflammation of the gland, to tubercle and syphilis, to cystic disease, hydatids, exophthalmic goitre, to malignant disease and their treatment. The last chapters of the book, XIV. to XXII., are devoted to accounts of the various methods of treatment, and the appendix is devoted to a tabulated summary of one hundred consecutive cases of removal of goitre by operation, performed by the author between February, 1894, and January, 1901. The results are at once highly creditable to the operator, and serve to establish the surgical treatment of diseases of the thyroid on a firm basis.

This book is a welcome addition to a hitherto greatly neglected branch of surgical literature; the appearance of the work is creditable to the publisher, and the author may rest assured that he has gained the approbation of his surgical colleagues by the thoroughly scientific spirit in which he has handled the subject of diseases of the thyroid gland.

# Acws and Motes.

#### DIPHTHERIA AMONG CATS.

CHICAGO is reported to be having an epidemic of diphtheria among cats. The amount of infectious disease transmitted by domestic pets is probably far greater than people generally have any idea of, and cats are especially sources of danger, owing to their "freedom of the house," even including the sanctity of the bed chamber. The cat, moreover, is said to be very susceptible to diphtheria, and it devolves upon the members of the profession attending in cases of diphtheria to properly instruct those concerned to this effect.—New York Med. Jour., May 18, 1901.

THE Progres Medical of April 27 gives the following prescription by Dr. Bocquillon-Simonsin for local application in cases of lepra, psoriasis and lupus.

THE OLEANDER LOUSE AS A TRANSMITTER OF MA-LARIA.—The part played by insects in the transmission of diseases is meeting with constantly growing consideration.M. Vicente (Archives générales de médicine, March; Gazette hebdomadaire de médecine et de chirurgie, April 28) thinks he has found a vehicle of malaria in the Aspidiotus nerii, a crustacean insect that infests the cleander. A certain family included a person who for many years had been subject to frequent malarial attacks. Some cleanders were added to the comments of the house, and three children promptly showed signs of malarial disease. The memoragon of malaria was found on the lice parasitie on the plants. New York Mede Jours, May 25, 1901 free complies and since malaria comments of the plants.

## Current Miterature.

Land were and the

### LEPROSY.

It is reported from Maryland that a case of leprosy was discovered there last week of more than two years' standing. The patient was formerly employed as a nurse, is married and has two children. The disease is of the mixed form.—

Journ. Amer. Med. Assoc., May 4, 1901.

LEPROSY ON THE CANARY ISLANDS.—The existence of about 200 lepers on the island of Teneriffe, Canary Islands, has been officially reported at Washington by United States Consul Berliner. He says that there are three distinct classes of leprosy on Teneriffe Island, namely, lepra arabum, lepra elephantiasis, and lepra tuberculosis. The disease diverges into two main varieties, the spotted and the nodular. The report is based on personal investigation and assistance of physicians, and says: "As being contagious, it is generally discredited here, but, in my opinion, it is very infectious. In former years Spain had established a colony at Grand Canary for lepers. They were housed there, but had perfect liberty to wander about with the restriction that they must sleep at the houses built for them. In course of time this law became a dead letter, and gradually they spread over the different islands. At Santa Cruz de Teneriffe, the capital, there are (from personal knowledge) twenty-two lepers, fifteen of whom are men, and there are also some children of these unfortunates. Officially it is not recognised that leprosy exists on these islands." United States Consular Agent Swanson, on Grand Canary Island, in an accompanying report, says that leprosy there is decidedly decreasing. There are fifty patients in the lepers' hospital at Las Palmas. A few families infected with the disease live in their own homes.—New York Med. Journ., April 27, 1901. (See "Leprosy in the Canary Islands," by Dr. Stanford Harris, Journal of Tropical Medicine, October 15, 1898.) 1362 1 1 2 1 1 1 1 1 2

#### LIYER.

HEPATIC ABSCESS: REMOVAL OF A RIB, RECOVERY.

—B. J., admitted to hospital on May 5, 1900, suffering from vomiting and diarrhea, but no fever. There was a doubtful history of dysentery at Singapore six months previously. The liver dulness was normal and the tenderness and pain (which were present

before his admittance) were gone. On May 16, his temperature rose to 100 degrees and kept up to between 100 and 101 degrees, when on aspiration pus was found in the liver. The abscess was opened in the usual way and a piece of the rib excised. The temperature fell in forty-eight hours to normal till June 1, when it again rose to 100 degrees, and on the 10th he had a very severe rigor with temperature 103 degrees. There was slight tenderness just below the ribs in the mid-axillary line. His temperature now kept rising to 105 and 104 degrees, and on the 13th six punctures failed to detect pus. His condition remained the same with furred tongue, vomiting, fever, and great loss of flesh and occasional rigors. Quinine, carbolic acid in large doses, and antistreptococcus serum were all tried without result. On July 19 the liver was again explored with negative results, but three ounces of clear serum were drawn off from the right pleural cavity. His condition getting worse he was again put under chloroform on July 22, when the whole of the ninth rib was found necrosed and was removed up to half an inch from the spine. His temperature still continued to rise in the evening to 100 and 101 degrees, but he slowly convalesced after a large abscess in the right thigh was opened. The patient's weight fell from 150 lbs. to 122 lbs. Patient was discharged on September 1. After a trip to Japan returned en route to England. His weight had improved, and this very large incision completely healed, though he still showed traces of the severe illness he had been through.—Dr. Bell, Hong Kong Civil Hospital Report, 1900.

#### MISCELLANEOUS.

YAWS AND SYPHILIS.—It is evident that Professor R. Koch does not coincide with Mr. Hutchinson in his opinion that yaws and syphilis are one and the same disease. As regards the former Dr. Koch says: "This disease is often met with in Kaiser Wilhelmsland (German New Guinea), the Caroline and Marianne Islands, and in the Bismarck Archipelago. In some of the villages, almost all the children are more or less affected. Every stage of the disease came under notice, from the initial lesion similar to small variola papules, to large confluences of smaller ulcerated nodules. These ulcerations were mostly situated on the lips, neck, genitals, and anus, as also in the axillæ. They may under certain circumstances resemble syphilitic condylomata, but the correct diagnosis of yaws is come to by the fact that children with healthy parents are almost exclusively affected."

As to syphilis Dr. Koch says: "In New Guinea the disease certainly exists amongst imported coolies, but not to a great extent. Its course and symptoms do not differ from those observed in Europe. I did not meet with a solitary case in purely native villages."

DE LA NATURE DES FIEVRES HEMATURIQUES DES PAYS CHAUDS. (The Character of Hæmaturic Fevers of the Tropics.)—Dr. Chas. Firket, after briefly

describing the symptoms of blackwater fever, gives as examples a few cases of this disease. He considers the fact that blackwater fever has a long period of incubation, i.e., that it breaks out a long time after the patient's return to Europe, of primary importance from an etiological point of view. The author utterly repudiates the idea of its affinity with vellow fever. Most authors attribute blackwater fever to malaria, although it cannot be said to coincide with an attack of malaria, as evidenced by the examination of the blood, idiosyncrasy against quinine, &c. The author is, however, of the opinion that though the fever is not actually malaria, yet a previous attack of malaria must have caused its development; in short, in his words blackwater fever is "un accident parapaludeen." The author is also of opinion that various injurious influences to which the European constitution is subjected in the tropics, such as chills, excesses, fatigue, or wet, in connection with malaria, prepare the way for blackwater fever. The better the hygienic conditions the rarer the disease. Dr. Firket does not consider hæmoglobinuria a specific disease, and, except in quite exceptional cases, denies the statement that quinine is capable of starting the complaint.—Bul. de l'Acad. Roy. de Med. de Belgique, 1900.

#### Letters, Communications, &c., have been received from :-

B.—Dr. F. Burge (Shanghai); Dr. Osborne Browne

Edinburgh); Dr. Oswald Baker (London).

C.—Dr. Albert Cook (Uganda); Dr. A. J. M. Closky (Lelangor); Mr. John Cretin (Bristol); Dr. J. Cropper (London); Dr. J. Howard Cook, C.M.S (Uganda).

D.—Dr. C. W. Daniels (London).

G.—Dr. Graham (Sumatra); Dr. John Gimlette (Pahang). M.—Dr. Preston Maxwell (Changpoo); Miss E. L. Mitche-

son L.R.C.P. & S. (Minzenberg).
N.—Mr. C. Nicholson (Cape Town).

O.—Dr. Ozzard (British Guiana).
P.—Fleet-Surg. J. Porter, R.N. (Haslar),

R.—Dr. W. Renner (Sierra Leone).

S.-Dr. Surendra Nath Sirkar (Sangor); Dr. W. Loudon Strain (Sao Paulo).

W .- Drs. E. G. and M. Hamilton Williams (Boreham Wood).

#### EXCHANGES.

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# The Journal of Tropical Medicine.

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In order to meet the constant enquiry for addresses of respectable firms catering for the various requirements so difficult to obtain abroad, we give a list of names and addresses which we trust will be found useful to our numerous correspondents and subscribers.

## Original Communications.

# ON HÆMORRHAGIC BULLA OF THE MOUTH AND PHARYNX.

By J. Preston Maxwell, M.B., F.R.C.S. Changpo, Fokien Province, China.

In the whole of this region of South China (Fokien), there exists a curious, startling, and at the same time, hitherto, as far as I know, unnoted, affection. I refer to the disease to which I have given the above name.

Its actiology is as follows:—It may occur in children and old people, but I have never heard of it in infants, and the majority of the cases are in the prime of life. It is a very common affection, about one-fifth of the adult population in my own region having either seen it or experienced it. It occurs at all times of the year, and is not absolutely bound up with any special act of the patient; but about 95 per cent. of the cases occur during the act of eating food.

The clinical picture of the affection will be sufficiently shown if I narrate two cases.

The first is that of a woman of 40, in a good position of life. While eating rice she suddenly felt a stinging pain in her mouth and became aware of a swelling on the roof of the mouth. She at once came to the hospital. In the middle line, at the junction of the hard and soft palate, and extending partially over both, was a large tense hæmorrhagic bulla, covering an area of the size of a 2s. piece. It resisted attempts to burst it, and was finally left alone, breaking of its own accord an hour or two later, and leaving an eroded surface from which dark blood oozed. This was easily arrested by a tannic acid gargle and a dose of ergot, and in a day or two the patient was well.

The other case was a man of 60. In him the bulla was situated on the inside of the right cheek, was slightly smaller than the preceding one, and had already burst. When he came to me he was run-

ning blood from his mouth, the blood being arterial in colour. The same treatment speedily arrested the hæmorrhage, but the patient was very frightened. It had come on while he was eating his rice.

The swelling never, as far as I can learn, takes place on the inner surface of the lips, but the roof of the mouth, the palate and uvula, insides of the cheeks, and pharynx, all have within my knowledge been affected. There is also a form of hæmorrhage from the stomach unattended by symptoms of the classical stomach affections, which may be due to some poison of this kind. I have only seen one case which occurred in a patient in perfect health, and apparently did his health no injury. All the cases I have hitherto seen have been Chinese. The blood bulla is always prune juice in colour, and generally the blood which oozes from the burst bulla is also dark. The patient is generally much alarmed, and on one occasion in my experience nearly fainted from the mental shock.

The pathology of the affection is obscure, and so far I have been unable to trace it. I have known it come on (a) while eating rice and small fish; (b) while eating candied sugar; (c) while drinking tea; (d) while eating soft biscuits; (e) while playing about. In the latter case the boy was positive some insect had bitten him, having entered while his mouth was open. His blister was on the soft palate at the base of the uvula, and was not a large one but bled freely.

The Chinese universally attribute the disease to the web of a peculiar fly-catching spider. This insect spins an insignificant web and catches its prey by springing on it. In several instances my patients have seen the spider jump out from their basin of condiments, and taking a piece from that place have been immediately victimised. But unfortunately all my efforts to artificially reproduce the condition in animals and man have been a complete failure. There are the black and the brown varieties of this spider. I have kept both, procured their web spun on sugar and in an empty box, and rubbed it on the

inner surface of the cheek without any appreciable result.

It is not due to the scratching of the surface by a bone or other article in the food. I have never been able to find the site of puncture, and it may supervene on a cup of tea or entirely soft fare.

The affection itself is undoubtedly a hæmorrhage into the deeper layers of the epithelium of the mucous membrane.

The prognosis is very good. I have never seen a serious case, but know of one or two where the swelling occurred far down in the pharynx and rendered breathing difficult and swallowing impossible till the swelling was broken. Occasionally the site may obstinately ooze for some hours, but it always finally spontaneously ceases. What would happen in a hæmophilic I don't know, and I have not been unfortunate enough to meet one yet.

The treatment is simple. A tannic acid gargle stops the bleeding quickly. Sometimes I give a dose of ergot which appears to help. The patient is forbidden to eat hard food till the mouth is well, and if the erosion is very painful a mouth wash is prescribed as occasion requires.

Appended is a list of a few cases the first nine of which were all seen by myself.

		Age			Size approx.	
1	G. N.	40	Eating rice	Hard and soft	2s.	piece
2	C. T.	21	Eating rice	Cheek	2s.	
3	C.	23	Eating rice	Cheek	1s.	"
4	Н.	16	Playing about	Junction of palate	6d.	,,
.2	K.	13	Eating can- died sugar	Junction of palate and cheek, an- terior pillar	2s.	,,
6	S.	60	Eating rice	Cheek	2s. 6d.	"
7	Ch.	24	Eating soft biscuit	Cheek	1s.	,,
8	J. B.	20	Drinking tea	Cheek	6d.	,,
9	B. T.	35	Eating rice	Palate	2s.	"
10	Н.	30	Eating rice	Deep down in pharynx	(?	
11	C. K.	21	Eating rice	Cheek	1s.	,,
12	K. S.	28	Eating can- died sugar	Palate	2s.	,,
13	H. T.	36	Eating rice	Cheek	2s.	27

#### PRICKLY HEAT.

By Frederick Pearse, F.R.C.S.Eng. Calcutta.

In a former communication to you on the above subject I fear that I must have expressed myself very clumsily, as several of your correspondents have misunderstood me. I look upon the rash of prickly heat as an acute seborrhea. It is identical in character with the rash commonly seen "at home," and called a form of seborrhea, which occurs in some persons, especially if they wear flannel, and which is usually caused by continued perspiration of slight degree with infrequently changed underclothes. An irritating secretion, made up of all forms of exudation from the skin undergoing decom-

position and crowded with germs, is doubtless the direct cause of this so-called seborrhæa, and of the so-called "flannel" rash with which I hold it to be identical. Prickly heat is exactly the same sort of thing, but modified by the conditions which excite it. Intertrigo, however, is quite a different disease, although excited by irritating secretions. The term seborrhœa is of course a bad one, because the disease is not merely an increased discharge of sebum. There is an increased sebaceous secretion, but with the seborrhea of home and the "flannel rash" and prickly heat, there are other conditions. I quite agree with Major Moore that prickly heat is an irritation of the skin produced by the constant bath of perspiration, so far as that description carries. It never occurs without free and long continued perspiration, although many persons who sweat profusely never suffer from it. My contention is that the disease is dependent upon the disturbed function of the sebaceous glands. It only occurs where these glands exist, and it occurs most frequently where these glands are not usually called upon for much work. The parts of the body covered with fine downy hairs are chiefly affected—not those parts provided with coarse hairs. Certain individuals are more subject to it than others. I should say that rheumatic and gouty constitutions were pre-eminently liable to it. Old residents in the tropics seldom suffer to the extent that comparatively new comers do. Athletic exercises and training in England do not excite the so-called seborrhœa unless associated with dirty habits, and I have not found that active exercise in India intensifies prickly heat. Probably the custom of frequent bathing, which removes irritating secretions, may be the explanation of this. At any rate the sedentary are equally the subjects of it as the active, if not more frequently so. It is not necessarily associated with clothing (because it is very common on the backs of the hands and the face), although I admit that clothing, especially flannel, is very liable to determine it. It is not surprising that anything which excites the blood to the skin and induces perspiration should accentuate the symptoms of prickly heat, even on the basis of its seborrhæic character. Does not the warmth of bed excite itching in scabies, in which neither the sweat glands nor the sebaceous glands are affected? To attribute to me the opinion that soap can produce an acute seborrhea is hardly fair. I do consider that soap is injurious to the skin by removing its natural grease, and that its use is especially to be deprecated in the tropics where perspiration is particularly free, but that is quite a different matter to saying soap can produce an acute seborrhœa. In the heated atmosphere of the tropics, and under the influence of excessive and long continued perspiration, the sebaceous glands are called upon for more work. A greasy skin may be more liable to comedones and acne spots, but it will not be so liable to sudamina.

I am very satisfied to find that my recommendation for oiling the skin has proved successful. Major Moore and I are practically at one so far as treatment is concerned. He prefers cocoa-nut oil— I prefer lanoline in almond oil. I find the addition of menthol to the mixture relieves the intense irritation most satisfactorily. The explanation of the disease must necessarily remain a matter of opinion. I still think that prickly heat is a form of acute seborrhæa. Whether any bacterial or fungous growth is the proximate cause I have not been able to determine. There are many reasons why we should expect this, especially the fact that profuse and even prolonged perspiration is alone not sufficient to produce it.

#### GOUNDOU PRECEDING CHRONIC HYDRO-CEPHALUS IN A MALAY CHILD.

By Lim Boon Keng, M.B., C.M.Edin. Singapore.

Two years ago a Malay child, aged 6 months, was brought into my consulting room. It had all the appearance of goundou as seen in some negroes.



The mother informed me that the child had had a fall, and that she thought the swellings on each side of the bridge of the nose were due to the blow which the head of the child received. Of course, I recognised that the growth was practically congenital and had slowly developed. At that time there was no sign of any other abnormality in the head of the child or elsewhere.

The swellings were carefully manipulated. They were symmetrical, and presented to the touch a resilient and elastic resistance. Beneath the skin we had practically the growth of bone tissue, with large cavities which possessed very thin walls. The growth must have proceeded from the ethmoid or frontal cells through ununited sutures between the nasal, premaxillary, and frontal bones. The subsequent history of the case confirmed this view of the origin of the swellings. Moreover, the most prominent parts of the goundou masses, were quite

soft, and here we could detect a slight pulsation which moved synchronously with the fontanelles. I came to the conclusion that the bone cavities contained prolongations of the cerebral meninges, and that the pulsation took place through the intervention of the cerebro-spinal fluid. I asked the mother to have the child photographed, and that if it got worse to bring it back with the photograph for comparison. The first portrait shows the goundou swellings rather indistinctly as the photograph had faded considerably, but the second picture gives an excellent representation of the goundou enlargements.

A few months ago the unfortunate patient was brought back to my office. During the year the head had steadily enlarged through the development of chronic hydrocephalus. All the great sutures were quite ununited with the exception of the lambdoidal. Some parts of the skin had grown in



thickness and there ossification had been complete. The right side of the skull was one mass of bone extending from the right parietal eminence down to the temporal and to the mastoid regions, while the left squamous portion of the temporal was entirely unossified. As usual in cases of chronic hydrocephalus, the superficial veins were visible.

The case, I believe, is quite a unique one, for goundou is hitherto known only among negroes or other races of Africa in whom the nasal bones are least prominent. The nature of goundou has been guessed at by various observers. The least satisfactory hypothesis is the parasitic theory of its origin. But the condition of the swellings and their relation to the hydrocephalus would incline me to regard this peculiar disease as a malformation with consequent non-union of the suture between the nasal and frontal bones.

The swellings were undoubtedly caused by a growth of cellular bone of the nature of the ethmoid bone. The cavities of the cells were filled with

prolongations of the meninges and were thus in communication with the cranial cavity. This fact alone could account for the pulsatile movements already mentioned. The thin bony structure resembled the membrana papyracea of the ethmoid. The growth must have come either from the ethmoid or from the cellular portion of the frontal where the sinuses are found.

The condition of the eyes was due to the disproportion between the eyelids and the orbital cavity. Through exposure the cornea were destroyed by inflammation. Death resulted from the effects of hydrocephalus. No post-mortem examination was

I have described the above case as "goundou" because I do not know with what else to compare it. I believe, however, that my case gives us a clue to the real pathology of goundou.

the present case presents itself is as nearly as possible 24° 18' north lat., and 91° 50' east long., and in a straight line is at least 200 miles from the nearest sea-shore.

The patient is a Mussulman, aged 27, a native of the district; he has never been far from home, and lives like his neighbours on meat, rice, fish, peas, and the like. He is married, but has no family. His brothers, and other near relatives, to the number of nearly twenty, men, women, and children, all live nearly in contiguous houses; they use the same drinking water and the same rice, and live otherwise exactly as he does, but he has fallen a victim to beri-beri while the others have not.

History of Illness.—About a year ago he suffered from "pains in the back," for which he used a liniment. This relieved him, but he thinks that he was weaker than usual afterwards. The present illness appears to have begun definitely about two months ago with pain and swelling of the legs and feet, followed by numbness and loss of power and

#### A SPORADIC CASE OF BERI-BERI WITH BLOOD IN THE URINE.

By A. B. DALGETTY, C.M., M.D. South Sylhet, India.

Cases of beri-beri are not common in India outside an endemic area, which is confined to a strip of coast in the Presidency of Madras. Hirsch says that cases have been recorded from Dacca and Assam, but these date back to 1880, and no recent cases appear to have been reported from these districts. Since all information bearing upon this obscure malady must be welcome, I venture to publish the following case, which seems to be a genuine and isolated example of the disease in question. Formerly, it was believed that beri-beri was restricted to coast-towns and to low-lying strips of territory bordering on the sea, but this limited area of distribution has had to be greatly extended since cases have been reported from places hundreds of miles from the sea, and from places at considerable altitudes.

The location of the spot in South Sylhet in which

difficulty in walking. These symptoms have progressively increased up to the present time, when it is as much as he can do to get about slowly with the help of a stick.

Present Condition .- He is a tall, well-built, intelligent young man, not at all anæmic; he walks with the high-stepping gait characteristic of weakness of the anterior tibial muscles; he has difficulty in rising up from a sitting posture and squats down

hurriedly.

Circulatory System.-The heart on first examination was rapid and tumultuous, apex heaving and systolic murmurs were heard over the aortic and pulmonary areas, but these had disappeared before the examination was finished. There was no cardiac dilatation so far as I could discover. The pulse was rapid, short, full and compressible, but regular in rhythm. He complained of palpitation and breathlessness on slight exertion.

Respiratory System showed nothing abnormal.

Digestive System.—Appetite fair, has sometimes feeling of nausea but does not vomit, has occasionally pain over epigastrium, bowels constipated, had no diarrhœa in the early stages of illness as is said sometimes to happen (Manson). Liver and spleen were normal.

Urinary System.—Has no difficulty in passing water. Urine amber-brown, slight flocculent deposit, acid, sp. gr. 1020, no albumin, no sugar; under microscope showed crystals of oxalate and phosphate of lime, and a cluster of epithelium apparently of the type found in the tubules of the kidney. (For condition of urine later, see end of article.)

Blood showed nothing abnormal. Xanthocytes well coloured, contour, size and shape natural, no excess of leucocytes.

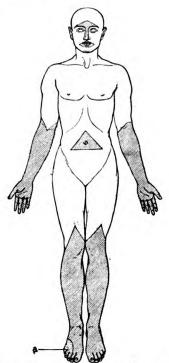


FIG. 1.—ANÆSTHETIC AREAS, FRONT VIEW.

Temperature, morning and evening, normal. Whether there had been fever during the earlier stages of the illness could not be correctly determined.

Integumentary and Muscular Systems.—There has been no skin eruption at any time. There is cedema of both feet, extending up the front of the legs to below the knee, but it is not excessive, though it pits distinctly under pressure. There is no cedema of the thighs or arms and no ascites, but there is distinct fulness of the skin in the umbilical region, and puffiness of the face especially about the eyes. Anasthesia is considerable or complete over the most part of the surface of the legs below the knee, and runs upwards on the front of the thighs for a distance of one-third their length; but an area over the back and outer side of both feet is much less affected, while two oval patches occupying both calves show little or no diminution in sensibility (figs. 1 and 2, a,a and b,b).

There is also a triangular patch of anæsthetic skin around the umbilicus, from four inches below to three inches above it, with a base of six inches. Both hands and forearms as far up as the elbows are more or less anæsthetic; the back of the fingers are less dull than the front. Diminished sensibility occurs also round both lips, over the bridge of the nose, above both supra-orbital regions and upwards on to the forehead (fig. 1). This peculiar distribution on the face is not commonly seen, I think. Over the spine in the lower dorsal region there is slight tenderness on pressure, which runs round both sides for some distance, but sensation appears to be normal all over the back.

Sensibility to cold and heat is normal but much diminished in acuteness. The numbness of the

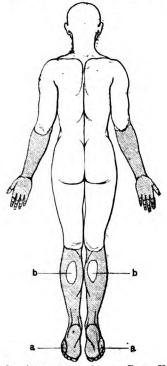


FIG. 2.—ANÆSTHETIC AREAS, BACK VIEW.

fingers is very marked, and pricking sensations occur in the hands and arms. The calf-muscles are very tender to pressure, and pressure over the course of the large nerves also elicits pain. Cramps occur, especially in the muscles of the calf. The patellar reflex is absent; ankle clonus is not produced. There is a good deal of wasting and softness of the muscles of the hands and forearms, but the muscles of the calf are rather hard than otherwise. The special senses are not affected, but the voice is unsteady at times.

The following is the cutaneous nerve supply of the anæsthetic areas:—On the leg, in front, the parts supplied by branches of the anterior tibial, external popliteal, and internal saphenous nerves are all affected; but those parts supplied by the musculo-cutaneous, viz., the outer three-and-a-half toes, and by the external saphenous (a,a), are much less so; behind, the area of distribution of the external saphenous nerve is practically unaffected. Above

the knee the anæsthetic area corresponds to the terminations of the external, middle, and internal cutaneous nerves. Umbilical area is supplied by the anterior cutaneous branches of the last four intercostal nerves. It is noteworthy that neither the lateral cutaneous branches nor the posterior divisions of these intercostal nerves are affected. This would seem to show that the particular nerves are attacked only at the periphery. On the face the anæsthetic spots are supplied by branches of the inferior maxillary, superior maxillary, nasal and supra-orbital and supra-trochlear branches of the ophthalmic.

The above would appear to be a genuine case of beri-beri. It was seen by several other medical practitioners, and all agreed in the diagnosis. It is a remarkable thing that a single isolated case of this disease should suddenly spring up in an inland, non-endemic spot. So far it is the only case. Whatever the cause of beri-beri may be, the old theories of water and food must be abandoned. Here is a man living in daily contact with a number of other people, eating the same food, drinking the same water, sleeping on the same ground, and otherwise behaving exactly as they do, yet he and he alone develops beri-beri.

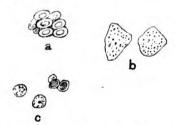


FIG. 3.—BODIES FOUND IN URINE.

Nowadays to ascribe the cause of any disease to food or water, to soil or climate, is only to confess our ignorance of that cause. These per se can give rise to no disease.

It would seem that the poison affects not only the peripheral nerves, but also causes a vaso-motor paralysis, hence the ædema of the anæsthetic areas.

Three months later.—During the past three months the patient has been slowly improving under malt, cod-liver oil, strychnine, digitalis, quinine, bitters, and such like. He has not changed his habits in any way, nor was it feasible for him to change his residence, although advised to do so.

Sensation has returned over all the dull areas; the hands have recovered their power, but the muscles of the legs are still weak so that the feet have to be lifted unnaturally high. The chief complaint now is pain and hardness of the calf-muscles. The patellar reflex is still absent, and the heart is yet too easily excited. But the most interesting point now is the state of the urine. It now contains a trace of albumin and considerable numbers of xanthocytes as well as different forms of epithelium (fig. 3). Manson says that albumin may be found, but that it is only occasional and accidental.

In the latest accounts of this disease, those published by Dr. Gibson in recent numbers of this Journal, little mention is made of the condition of

the urine. But it might be worth while for those who have numbers of cases, easily got at, to take more frequent and more careful note of the urine, for albumin may be more common than is supposed.

At the first trial I missed the albumin, and it was only after finding the altered blood corpuscles with the microscope, that I returned to the test and found a distinct trace of albumin. No complication has arisen so far as I can see which would account for this. The albuminuria may be intermittent, and thus may not be found at any given time.

The man is not a regular patient of mine, and I see him only at considerable intervals, hence the fewness of the observations.

Mosquito Destruction.—The United States Department of Agriculture has issued a circular written by Mr. L. O. Howard on the habits and methods of destruction of mosquitoes. Even in houses screened against mosquitoes these pests may find access, and when they do Mr. Howard recommends:
(1) The slow burning of cones made of moistened pyrethrum powder; this, however, is only a palliative and wards off mosquitoes without destroying them; (2) mosquitoes on the ceiling of a bedroom may be easily killed by placing under them a shallow tin vessel nailed to the end of a stick and moistened in the inside with kerosene; (3) destruction of larvæ in breeding pools; (4) draining ponds and marshes; (5) stocking the breeding ponds with fish, are all mentioned as efficient means of ridding a house or neighbourhood of mosquitoes. (6) Kerosene in the proportion of, say, 1 ounce of oil to 15 square feet of water surface is deemed sufficient to effectually destroy mosquito larvæ; the application being renewed once a month. Cess-pools, cisterns, water in water-barrels, &c., may be rendered innocuous by kerosene; and if the drinking water is drawn off from the bottom of the vessel or tank, the kerosene does not affect the taste or composition of the water. Extensive marshes present great difficulty in treatment by any application except by drainage; a procedure which in many places proves too expensive to be undertaken.

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THE

# Journal of Tropical Medicine

July 1, 1901.

#### GRASSI AND HIS CONTEMPORARIES.

CONSIDERABLE discussion, attended by not a little acrimony, has arisen lately concerning Professor Grassi of Rome, and several of his fellowworkers in the field of malarial pathology. We lament this contretemps, but we are by no means inclined to take sides in the matter. The scientific world so justly appreciates the work done of late years in the elucidation of the malarial problem, that it is a matter for regret that the great men, whose names will be for ever associated with the subject, should appear in any light but the most favourable. We have read of late an attack on Professor Grassi by his former co-worker Professor Calandruccio, and we have very reluctantly thought it our duty to publish a translation of Calandruccio's letter on the subject. support the statements made in the letter, from

the fact of its appearance in our columns, does not follow by any means, nor do we express an opinion for or against either the accuser or the accused.

Grassi's name must go down through all time as one of the foremost workers in the elucidation of the malarial problem and as one of the most earnest and most accomplished zoologists of his No one can come in contact with Grassi without at once recognising him as an enthusiast in science, as an original observer of the highest order, and as a man endowed with a capability of work for work's sake perhaps without an equal in his generation. In his small laboratory in Rome, which affords but a humble housing for this giant in research, which is but ill-equipped as modern laboratories go, Grassi has produced work which will lend imperishing fame to his name. His fellow workers—we will not say his enemies, for we are sure his devotion to science secures him against that—say that he has on occasion laid claim to original thoughts which have occurred to other men first, and who see fit to stand up for their own. This appears to us to be what the "storm" resolves itself into: but we find ourselves incapable of waxing wroth on the matter. We do not pretend to judge between the parties in the strife, and we would wish, were it in our power, to allay the irritation which seems to have been caused. The men whose names adorn our modern annals of tropical pathology were, we hoped, above the weaknesses and prejudices of lesser lights, and we would wish to consider them so. Commencing with the Frenchman Laveran we hold in the highest esteem the names of Grassi, Bignami, Bastianella, Celli, and Marchiafava amongst Italian scientists, of the names of Manson and Ross amongst British workers, and of MacCallum amongst Americans. These men will for ever be regarded as the pioneers in the fight against malaria, and we would desire to emblazon their names and their fame on "clean" escutcheons, so that posterity may honour where honour is due without the din of an acrimonious discussion in any way tarnishing the lustre.

#### THE LIVINGSTONE COLLEGE.

An interesting ceremony took place at Knott's Green, Leyton, on Thursday, May 23, when the formal opening of the College was fittingly performed by Mrs. Bruce, Dr. David Livingstone's elder

daughter.

The Principal, Dr. Harford-Battersby, in his address stated that the College was opened in 1893 by a small body of medical men who were interested in providing elementary training in medicine and surgery for missionaries. At first the College was situated in Bow Road, but it soon outgrew its surroundings, and was subsequently located in Stratford, London. This again proving inadequate, the present beautifully situated house was secured and fitted as a College.

It may be well at once to state that the course of study provided at Livingstone College in no sense entitles those who have passed through its course of study to style themselves "medical missionaries," or to assume the position of a qualified medical man. This is a point which we are sure the authorities of Livingstone College rightly insist upon, and it is one which, we rest assured, that the earnest men who avail themselves of the benefits of the College

will never wish to traduce.

#### THE LIVINGSTONE EXHIBITION.

In the Westminster Town Hall, on June 17, 18, 19, 20 and 21, what was termed the Livingstone Exhibition was open to the public. The exhibits were interesting to a degree, and still more attractive was the series of lectures delivered during the

several days the exhibition was open.

The Principal of Livingstone College, Dr. Harford-Battersby, gave four lectures on the "Preservation of Health in Tropical Climates." On June 18, the subject of the lecture was "Clothing in the Tropics," in which the lecturer dealt theoretically and practically with the clothing of Europeans in warm climates. On June 19, "Food in the Tropics" was ably discussed. On June 20, the important subject of "Water in the Tropics" allowed the lecturer an ample field, more especially as regards the relation of water to diseases and the purification of water. The "Prevention of Malaria" was discussed on June 21, when the modern views of malarial infection were stated, and practical lessons deduced Dr. Harford-Battersby is a capable lecturer and an excellent teacher, and we are confident that the instruction he gave will prove of infinite value to all tropical residents, and especially to those about to take up residence in the tropics. A number of interesting social functions distinguished the exhibition, and in addition to the lectures mentioned, several discussions were opened by well-known experts. Of these the discussion on "Acclimatisation," by Dr. L. W. Sambon, when Dr. Manson, C.M.G., F.R.S., took the Chair, was especially good. Lectures by Dr. F. W. Willway on "Health Precautions in Cold Climates," by Dr. Robert Howard on "Some Hints on Nursing Malaria," and by Dr. Sambon on "Life in a MalariaProof Hut," were highly appreciated by attentive audiences

We hope the exhibition proved the financial success it deserved to be, and we congratulate Dr. Harford-Battersby, who originated and organised the scheme, upon the excellence of the programme and upon the smooth working of the exhibition.

# THE MALARIA EXPEDITION TO THE WEST COAST OF AFRICA SENT OUT FROM LIVERPOOL.

(Communicated).

THE Liverpool School of Tropical Medicine, which has become to a large extent identified with the efforts which have been so successfully made in recent years to trace the source of malarial infection, has now embarked on a wider undertaking, namely, the endeavour to clear a given district of malaria. Since the School was founded expeditions have been despatched every year to the fever-haunted West Coast of Africa under the direction of Major Ross, F.R.S., and the observations which have there been made have amply confirmed the Manson-Ross theory as to the connection between malaria and the Anopheles mosquito, and have also perfected our knowledge of the life history of the malarial parasite, and of the way in which it gains admittance to the human organism. Our knowledge of the subject may now be said to be pretty nearly complete, and may be briefly summed up as follows:—The parasite has two stages of existence, one is passed in the body of the mosquito, and the other in the body of man. The form which is present in the blood of malarial subjects undergoes a sexual propagation in the body of its host. Some of these organisms are withdrawn by the mosquito, enter the stomach of the insect, and there undergo sexual development, with the result that after passing through the stomach walls they form spores in the body cavity. These spores find their way to the poison gland of the mosquito and are introduced into the body of the next person it bites.

The mosquito is thus seen to be the carrier of the infection from one individual to another, and if there were no mosquitoes fresh cases of malaria would cease to appear. The Anopheles mosquito, the only kind which conveys the parasite of human malaria, has certain well-marked characteristics which enable it to be easily recognised, and its larval forms are found in puddles which are few in number and occur only in certain well recognised situations; and the winged insect does not fly far from the pool where it was hatched. These circumstances have led Major Ross to entertain the hope that, given a free hand and a fair number of intelligent assistants, it might be found possible to rid a given town or district of the Anopheles, and consequently to abolish malaria from it.

#### A Generous Donor.

The chief obstacle in the way of putting this theory to the test of experiment has been the expense which it would involve; but this year a gentleman in Scotland who desires his name to be

withheld from publication, has generously guaranteed the expense of exterminating the Anopheles from a given district in West Africa for a period of twelve months.

#### The Town of Sierra Leone

is the place which has been chosen for carrying out this great experiment, and the expedition, which includes Major Ross and Dr. Logan Taylor, lately Assistant Lecturer in Pathology in the University of Glasgow, sailed from the Mersey on June 15, on Messrs. Elder, Dempster & Co.'s steamer Axim. Forty assistants will be employed in carrying out the work of the expedition, which will consist in destroying mosquitoes and their larvæ wherever they can be found, filling up or draining pools and puddles, or where this cannot be done pouring on kerosine or some other oily body which will form a thin scum on the water.

By these measures and others of a like kind it is expected that the Anopheles will be largely destroyed throughout the town of Sierra Leone, and that its opportunities of breeding will be very materially curtailed if not entirely abolished. If at the end of twelve months the measures which have been taken to destroy the mosquito are successful and the frequency of malaria is materially reduced, it is expected that the local authorities will undertake the work in the future, and that it will be extended to neighbouring settlements. Major Ross will arrive during the rainy season, and consequently for some time the work will be carried on indoors, and will consist in killing the mosquitoes in houses. Major Ross hopes to be able to return to England in six months, but Dr. Taylor intends to stay out a year

and see the year's work to an end.

The departure of Major Ross and Dr. Taylor was witnessed by a large and influential gathering of merchants and shipowners, and of representatives of the Liverpool University College, who met on the landing-stage to give the expedition a hearty send off. A message was also received from the Colonial Secretary wishing the expedition success, and stating that he had instructed the Governor of Sierra Leone and other Government officials, to give it all the assistance in their power. Mr. A. L. Jones, the Founder and Chairman of the Tropical School, went on board the Axim and spoke a few words of congratulation to Major Ross and Dr. Taylor. He said it was fitting that those present should extend the best of wishes to their friends who were about to proceed on an expedition in the interests of science and humanity. It was greatly to their credit that they had volunteered to take this perilous voyage. He was glad to say a few words on behalf of the Liverpool merchants and shipowners. The Tropical School had done good work in many ways already, and from the fact that the mosquito theory had received the support of Lord Lister one could hardly doubt that it would be ultimately successful in protecting people from the dangers of tropical climates. He assured Major Ross that if anything were wanted in the way of funds, Liverpool people would find it.

Major Ross, in responding, said that they were greatly indebted to Mr. Jones for what he had done in connection with the work in question. It was he who had started it, and he had not only supported it in various ways, but had shown an active interest in it. Had it not been for Mr. Jones's wonderful instinct for bringing things to a success, and for his wonderful knowledge of men and affairs of all kinds, the School would never have been able to reach this point. He had not only given money to the work, but had secured honour for the professional members of the School on every possible occasion. When the undertaking had been brought to a successful issue, the whole country would see the magnitude and benefits of Mr. Jones's labour. They had a great work before them, but he thought that the expedition would be a success, and that the work would spread to all parts of the West Coast. They must get this coast to be as healthy as India. He did not believe that West Africa need be more unhealthy than India; and he believed that it was because Europeans did not know how to live there properly that the death-rate was so high.

## Translations.

UNICUIQUE SUUM, PROF. J. B. GRASSI! (EVERY MAN HIS OWN, PROFESSOR GRASSI.)

By Dr. SAUVEUR CALANDRUCCIO.

Professor of Zoology and Comparative Anatomy in the University of Catane. (Translated from the French by P. Falcke.)

I AM constrained to publish the following facts in order that the gentlemen on the Committee of Examiners for the competition for the Professorship of Zoology, Anatomy, and Comparative Physiology should be made acquainted with the whole truth. After having worked for over thirteen years with Professor Grassi at Catane, that gentleman once in Rome entirely forgot his old partner in study, and on January 17, 1897, wrote to him as follows:

"After your letter dated 14th of January, 1897, all communication not having relation to the study in progress on the Murenoïdes is at an end between us. I should like to see what you will do alone, and what precise part appertains to you in the works published in both our names and in my laboratory; the world will be able to judge this exactly by the results you will obtain alone and far away from me. The work on the Murenoïdes will be published in both our names provided that you continue to furnish the material you are able to collect."

To prove that I could work alone, without requiring his help, I published a series of works which, I trust, the Commission will examine impartially. From what I have said above, Professor Grassi's intentions are quite clear, for since 1897 threatened that he would not state precisely what portion of the work done by us in common was due to me. Does it not appear like extortion when he expresses himself thus: "The work on the Murenoïdes will be published in both our names provided that you continue to furnish the material

you are able to collect?" But not only did Professor Grassi profit by the material, he profited still more by my ideas and by my observations, as may be gathered by consulting various letters of advice I addressed to him, and the copies of which I have kept. But let us pass to other matters. I declare with all the power of my conscience that all the works published in my name alone are entirely my own, and Professor Grassi had nothing to do with them. If he did have anything to do with them it was to pirate from them. Of this I will give an example. I described the filaria recondita of the dog, and he, having in hand the publication of my work, made a summary of it for a German journal, and wrote to me as follows: "The article on the filariæ has already been sent to the printer's. I have written on the top 'Professor Grassi in collaboration with Dr. Calandruccio,' and I have mentioned that the illustrations and descriptions are taken from your medical essay, and that you found the nematode in the tick (RHIPICEPHALUS SICULUS, Koch).'

The real truth, however, is that the work belonged to Calandruccio entirely, and Grassi had taken no part in the same. It was Calandruccio who was the first to discover the embryos in a filarious dog belonging to Dr. R. Cannizzaro, and the larvæ in the fleas and in the ticks of the dog, as also in the fleas of man. Very well, the preliminary notes

appeared with the two names.

Calandruccio discovers the cycle of evolution of the ascaris lumbricoides and of the tricocephalus dispar, and shows the experiments to Grassi who praises them and says: "I shall publish a note in your name in a German paper." This preliminary note duly appeared, but not under my name but under his, thus expressed: "My pupil Calandruccio," implying that I had studied under his direction, whereas I had not made my observations in his laboratory, and he was ignorant of them before my communication.

Calandruccio, in 1885, discovers a new arachnide arthrogastre (Kænenia merabilis); we studied it together and the preliminary note with our two names appeared in the Naturaliste Sicilien; Professor Grassi at once writes the observations in extenso without mentioning Calandruccio. I ask is this or is this not a serious—well, I will content

myself by calling it merely indelicacy?

This, however, is not all. Calandruccio discovers the transformation of the Leptocephalides into Murenoïdes, it costing him 6,000 francs out-ofpocket expenses; he falls ill from acute nephritis caused by overwork; hardly recovered he enthusiastically pursues his studies, and experimentally completes the cycle of evolution of nearly all the leptocephalides into murenoïdes, and particularly of

Now Professor Grassi, having everything in his own hands, and taking advantage of a very upright communication I made, writes that my name can no longer appear with his, and he gives me six months in which to publish what I had discovered in relation to this work, to enable him in the meantime to publish on his own account the investigations he had made. He adds that the scientific material which I asked him to return were in a bad condition.

What was Professor Grassi's motive in taking this step? He knew very well that even several zoologists working in conjunction could not accomplish in so short a time a work which had taken six years of steady work; he knew that all the materials, my ideas and my researches were in his hands; he knew therefore that if I compiled so extensive a work I should have to depend almost exclusively on my memory, and should consequently be inaccurate; he knew that for making the plates alone six months would not be long enough even if I worked all day.

Is this an honourable mode of proceeding? Those persons who read these few pages shall judge.

Every argument I could use to persuade Professor Grassi to change his mind failed, so that in spite of myself I am driven to have recourse to competent tribunals to prove that dishonesty must have a limit.

Then Professor Grassi, with a view of exonerating himself, accused me of ingratitude and worse; nevertheless, I should like it to be known that I have treated him very liberally. He could not deny that his work on the procreators of the insects and myriapods were not to a great extent my work and had cost me much labour. Professor Calandruccio worked without relaxation for seven years on the notes on the termites, and Professor Grassi not being able to absolutely deny the collaboration, sheltered himself by saying: "I thank Dr. Calandruccio for the assistance he has given me in this work.

If my researches and my observations, as also those of Dr. Sandias, were taken away, what would remain to Grassi of the work on the termites? Certainly very little.

Calandruccio, after numerous and wearisome experiments, discovers that the tania nana developes direct in man, and Professor Grassi takes the credit

of the discovery to himself.

And what shall I say about malaria in regard to studies made at that time in Catane? Calandruccio made the experimental project, spending much money for the necessary materials, he carried on researches, demonstrated that there is no polymorphism, &c., and, being threatened by proceedings, Grassi took fright and asked Calandruccio himself to give him certificates to prove that he (Grassi) had nothing to do with this affair.

Notwithstanding all this, Grassi appropriated the

merit of the work of someone else.

It is well to remember that Professor Grassi in his book "Studî di un zoologo sulla malaria," does not mention Calandruccio's work at all, though he knew very well to what extent he contributed to the actual knowledge of the stability of the species of malaria parasites and to the non-transmission of malaria by means of water. I pass over in silence many more facts that I could mention for the honour of science, but I cannot keep silence on this last performance.

Calandruccio discovered the larvæ of a filaria in

<sup>\*</sup> For this Grassi received the Darwin prize of the Royal Society.

cushions. He at once went to the Simeto (Piano di Catania), and in an inn found many infected cushions; he examined the domestic animals and confirmed the fact that the dog is the definite host.

Lately Grassi announced this discovery as having been made by him, and no mention was made of Calandruccio except to lower him and place him in

a bad light.

If certain great zoologists, more or less frail, were denounced to the Crown Prosecutor for their continual prevarications, and for the petty thefts they have committed from cabinets and museums, they would certainly have to exchange the professor's chair for the prison. But one's self-respect and the fear that during this time, while competitions are taking place, one might be accused of extortion, impels one to silence for the time being.

In conclusion, Professor Grassi ought to have a little more respect for those who have studied long and arduously, and, what is more, should not torment them by doing harm from malice, so as not to force them to demonstrate to the world, scientific and profane, that his greatest merit is to play the pirate, to speak evil of everybody, and to enlarge those points of science on which others have already thrown a bright light.

Rome, October 11, 1900.

P.S.—Professor Grassi obtained the Darwin medal at the London Academy for his work on termites, and for his researches on the transformation of the leptocephalides into Murenoïdes. He at once wrote to Calandruccio, who had not attended the Congress, to say he could not send him half the medal, and that of the 2,000 francs received, he intended to keep 1,000 francs, and 1,000 francs had been spent on the plates of their common work.

#### DOES MALTA FEVER EXIST IN HAVANA?

By Dr. EMILIO MARTINEZ.

(Translated from the Spanish by P. Falcke.)

In addition to the number of infectious fevers such as infectious enteritis, enterosepsis, &c., there has been known for some years in Havana a feverish illness of long duration and varied symptoms, the etiology of which our principal medical men do not exactly know, though all are unanimous in the view that it is neither malaria nor typhoid fever.

It seems to me that this disease is no other than Malta fever, an opinion I shall demonstrate clinically. Dr. Juan N. Davalos, in a communication to the Academy of Science entitled "Does Malta Fever exist in Cuba?" and which communication was published in the Cronica Médico Quirúrgica of January 15, 1899, presented some facts which go far to confirm the existence of the illness in Cuba, and he expressed the necessity of employing the serum reaction in suspicious cases. In one case I tried this serum reaction with a culture supplied to me by Dr. Juan Guiteras, with negative results. The doctor sent some of the same culture also to Dr. Davalos, who first propounded the question as to the existence of Malta fever in Cuba, for his in-

vestigations, but Dr. Davalos informed me that with him also the serum reaction, carried out subsequent to his work at the Academy, had negative results.

Although this bacteriological experiment, that would have been decisive in this connection, failed, yet the clinical analogies between this disease in Havana, and Malta or undulant fever, so graphically described by Hughes, is so marked that we are impelled to direct the attention of our colleagues in Havana to it, and to ask their co-operation to solve the problem.

The most common form of Malta fever is the undulant type which is characterised by a febrile period of long duration (months and years), with such gradual variations of temperature, that it appears like one single fever forming great waves, and in which the apparently afebrile periods are really part and parcel of the ailment, being mere intervals in the feverishness. The cases here presented are in character and symptoms such as are

exhibited in actual Malta fever.

Case 1.—Mrs. M. C. B., white woman, aged 30, without pathological antecedents. She was taken ill on August 22, 1898, with high fever, rigors, and pains all over. The tongue was coated, and the patient was very constipated. During the first days of September pain set in in the right arm at the elbow joint, attended by swelling of the tissues at this spot. Bisulphate of quinine proved useless (it was administered three times without modifying the fever), as also did salicylate of soda. The temperature rose to 39 degrees C. and fell to 38 degrees C. next day. The temperatures on some days rose to 40 and 40.5 degrees C. On September 11, in conjunction with Dr. Rensoli, an incision was made in the swelling at the elbow, and, instead of finding pus, we only encountered serous infiltration of the tissues. On October 4, a painful swelling occurred on the interphalangeal articulation of the left forefinger, and in November another painful swelling on the shoulder joint appeared.

The fever during the whole of this time had not fallen below 38 degrees C., but there were no further symptoms beyond constipation and marked emaciation. Commencing on November 30, a gradual defervescence set in, the temperature, after ninety-eight days of fever, reaching 37 degrees C.

To recapitulate: There was continuous fever of a remittent type of between 38 and 39 degrees, lasting ninety-eight days, and accompanied by constipation and sweats. There were articular non-suppurative swellings; all the viscera were normal. A paralysis of the extensors of the right arm was observed after the illness had been present some time.

The treatment consisted of alteratives (small doses of calomel and sulphate of soda every three or four days) and sponge baths during the high fever. Milk diet during the first month, and ordinary food in addition.

Case 2.—X. X., man, aged 34, of a robust constitution, fell ill April 19 with rigor and fever of 40 degrees, insomnia, headache and general pains, coated tongue and constipation. During fourteen days the fever remained between 38 and 39 degrees without other symptoms than disorders of the diges-

tive system; the fever decreased slowly; alterative treatment and quinine given to saturation without modification of the fever. The patient only kept his bed a week and decreased 14 lbs. in weight during the fourteen days of illness. Three days of apparent apyrexia with a temperature of 37 degrees followed, to give way to another attack of fever as violent as the previous one. This attack lasted ten days, but the patient did not keep his bed. The former treatment with quinine proved equally inefficacious, and the emaciation was this time worse than the time previously. Renewed apprexia of fifteen days, giving place to a third attack of fever of twenty-one days' duration with the same symptoms as previously. The emaciation was now so extreme that his friends hardly recognised him. There was then a remission of thirty days followed by a fourth attack as severe as the previous ones, and this time complicated by a suppurative enlargement over the sternum which resisted all treatment, and only healed after being incised. The patient recovered.

To summarise: Four attacks of fever lasting from

To summarise: Four attacks of fever lasting from fifteen to twenty days each, with intermissions of ten or twelve days' duration; no other symptoms than a fever of remittent type, accompanied by constipation and marked emaciation. This case was also observed by Drs. Fernando Rensoli and A. Abril.

Case 3.—C. L., a strong boy, aged 9 years; no pathological antecedents. He was taken ill on May 15 with high fever of a remittent type accompanied by severe articular pains and constipation. The fever continued from this time during the whole of June and the first fortnight of July. At this time he was under the treatment of Dr. Coronado, who prescribed aperients and quinine without results. Besides the articular disorders he was delirious during the days of hyperpyrexia, with symptoms of nervous excitement.

A week of apyrexia followed, to give way gradually to fever of a nature similar to that of the first attack, and which did not abate till September 30. A subsequent intermission began in October, the patient improving in health considerably during this interval. The fever re-appeared on October 20, and was this time accompanied by acute pain and articular swellings. After lasting till the middle of January the fever commenced to subside gradually and at last disappeared.

During the whole course of the illness the patient had no symptoms but articular pains, constipation, flatulence and emaciation. Quinine, though administered several times, exercised no effect whatever on the fever.

The clinical history of these three cases exactly resemble in character that of undulant fever. In the first case there were long waves lasting ninety-eight days. In Cases 2 and 3 the undulations were still more marked because the base of the wave (the intermissions) were approximately 37 degrees C., a temperature which, as Hughes says, is not apprexia, for it is only those who have recovered, or who are actually convalescent that have subnormal temperatures. The second case lasted 114 days (without counting the complication) and had four undulations. The third case had eight months of fever with three waves, and one that was incomplete. The pro-

longed duration is another characteristic of Malta fever.

The mildness of this type of fever in Havana also much resembles the benignity Hughes drew attention to.

These three cases also exhibit the articular localisations which according to Hughes occurs in 40 per cent. of the cases, and are therefore to be considered as specific to the illness.

As to the constipation and flatulence, these remain present and do not entirely disappear until convalescence sets in.

The paralysis of the extensors which occurred in the first case during the second year of the illness is a late complication, and Wescott, who studied this symptom, is of opinion that it never sets in previous to the fourth month of fever. We think we have succeeded in establishing the identity of Malta fever with our so-called infectious fever, which is undoubtedly of an undulant type; and further we can no longer doubt that we have in our midst the malignant type also of this disease, though as yet we have not sufficient clinical evidence to affirm the fact, for the malignant type of the disease is often confounded with tropical dysentery.

I have carried out my purpose of directing the attention of our medical men to this obscure point of tropical pathology, and it would be well were they to examine the blood of their patients to prove by the positive serum reaction of the micrococcus melitensis whether undulant fever is prevalent in Cuba or not.—Revista de Medicina Tropical, April, 1901.

# DISEASE AMONG THE NATIVES OF THE NYASALAND PLATEAU.

By Stanley Kellett Smith, F.R.C.S.Eng. (Reprinted from the "Liverpool Medico-Chirurgical Journal, March, 1901).

The study of tropical diseases has, in these later years, assumed such interest and importance that I have been tempted to commit to paper a few notes from my medical diary kept during the exploration of the country between Lake Nyasa and the Muchinga Mountains in the years 1895-96.

The manner of physical man we have to deal with may be judged from the following measurements. The statistics are of males only, and in each case great care was taken to select subjects of pure breed.

Measurements were made as follows:

HEAD .-

Length—(a) Greatest calliper span with the glabella as the anterior part; (b) tape measurement from glabella to external occipital protuberance.

Breadth—(a) Greatest calliper spans. (b) Tape measurement across vertex, between zygomatic tubercles.

Zygomata.—Greatest calliper span between the cheek bones.

Nose.—(a) Length from tip to root. (b) Calliper breadth of nostrils.

Cubital.—From tip of olecranon to tip of extended middle finger.

SPAN.—Between tips of extended middle fingers, with arms abducted at right angles to the trunk.

STATURE.

SITTING HEIGHT.

The head measurements, together with the cubital, were taken in the metric system. The span, stature, and sitting height are expressed in feet and inches.

Taking the individual measurements from which the averages were derived, one notices much less difference between them than would be the case if dealing with subjects of a civilised race. The correlation is better; the type is more uniform.

	Atonga.—From Bandawe and neighbouring Villages on Lake Shore. Average of 25 Adults.	Wa-Bisa.— From Kamb- wire's Kraals. Average of 17 Adults.	Wa-Gunda.—From Chuaula's Kraals, Average of 23 Adults,
Head.—	C.	C.	C.
Length—(a)	18.62	19.2	18.61
,, (b)	33.36	34.45	32.56
Breadth— $(a)$	14.73	15.04	14.7
,, (b)	34.4	33.97	34.35
Zygomata	13.77	14.18	13.36
Nose— $(a)$	4.09	4.2	4.21
,, (b)	4.3	4.4	4.2
Cubital	46.42	46.83	47.8
Span	5' 77"	5' 71"	5' 101"
Stature	5' 41"	5' 5 <del>1</del> "	5' 51"
Sitting Height	2' 75"	2' 103"	2' 81"

In point of muscularity the native is of very fair velopment. The thighs and the muscle-groups development. parallel to the spine are his best points. Without being actually a strong man, he is capable of great endurance. The journey between a certain station in Northern Angoniland and Bandawe, roughly about sixty miles, and a very bad road, has often been covered well within sunrise and sunset. The porters of a caravan, each carying a load of halfa-hundredweight upon his head, will travel at a pace which, taken over a long march and for a whole day in cool weather, or from 6 a.m. to noon in hot weather, and excluding occasional brief stops, will give a mean of 21 miles per hour, and this will be kept up for several weeks at a stretch, the daily march being taken as about twelve miles.

The native is not a long liver. Old age is rare, and the vital average might range with our own statistics of the twelfth or thirteenth century.

The majority of the local ailments are very trivial. Common cold and slight digestive disturbances, together with mild attacks of malaria, pretty well fill up the usual medical cases, and the surgeon has to deal chiefly with ulcers—the sequence of wounds or of the "chigoe"—which have taken bad ways through the native habit of plastering up sores with leaves of various trees supposed to possess healing properties. Death results generally, apart from violence, as the result of some acute general disease. Malaria accounts for many, attacking the inhabitants not so frequently as the white stranger, but presenting often in the former an unusual severity and a high average of serious complications. Smallpox is

endemic, the central countries of Africa and India being its native foci. Tetanus appears, but is not

frequent.

Rabies exists, and its fatality is recognised. One day our camp in Mombera's country was thrown into utter confusion by a sudden stampede of all attendants and of certain chiefs who were engaged in a palaver with us. Warnings were shouted from every side, "Garu! Garu!" and a native cur came rushing blindly through, head down, tongue out, and ropy saliva dribbling from the mouth. It was subsequently shot, and a post-mortem examination showed many signs of rabies.

Stomach contained pieces of half-digested bone, together with considerable quantity of grass, twigs, sand, &c. Mucous membrane injected in parts, with

small hæmorrhages.

Epiglottis much injected and inflamed, with capillary hæmorrhages on its sides and posterior surface. Lymphoid follicles at base of tongue swollen. Much sticky mucus about fauces.

Much sticky mucus about fauces.

Brain.—Hinder part of brain and medulla somewhat injured by shot by which the animal was killed. The sounder parts, on section, showed punctiform

hæmorrhages.

A big chief who was present explained that "it was well to kill this dog, for men bitten by such might become like them and would then die." No information could be obtained as to the occurrence of rabies among any of the various buck in the country—a point of interest in view of the outbreak among the deer in Richmond Park in 1887, and of the latter occurrence at Ickworth Park.

Deformities are not often met with. Even a common lateral deviation of the spine is very seldom seen—a result possibly of balancing the waterpots and other burdens upon the head, and thus strengthening equally the muscles acting directly upon the vertebral column. The starchy diet upon which the children are fed almost from infancy does not produce in them those osseous lesions of rickets which, with similar food, would be frequent in our own climate. Levacher's statement of the remarkable frequency of fragilitas ossium in negroes is certainly not supported by experience in this particular country.

Now among these people umbilical herniæ are exceedingly common, probably on account of the scant attention paid to the cord at birth. They never seem to cause trouble, however, and for the most part disappear spontaneously during the earlier

years of life.

With inguinal hernia it is very different. This, by far the most common physical disorder with us, occurring in an almost incredible proportion of the male population, is so rare among them as to be practically unknown. The reasons for this great contrast are of interest.

In the beginning the mother carries her child seated on the prominence of the hip, its legs embracing her flank, and its whole weight borne by a simple sling carried to the opposite shoulder. Think for a moment of the position of the legs in utero and of their inclination at birth; the tendency to flexion of the thigh at the hip and to abduction of the whole limb are simply followed and main-

tained. The posture of the infant is entirely natural, so natural than an ardent Darwinist would almost expect the little one to reach up and gain its whole support by instinctively twining its fingers in the parent's axillary hair. One sees tiny mites of a very few days' existence nursed in this manner with perfect comfort.

The advantages to the child are obvious. If a male, the descended testis is kept in its place in the scrotum, an open processus vaginalis is encouraged to close, and the inguinal canal, still inclined to patency after the passage of the sexual gland, is adequately supported by the conforming

pressure of the mother's side.

We, in our wisdom, take other ways. We bind down and almost splint the struggling legs by weight of swaddling-clothes, and still their protests by folding or pinning these after the manner of a sack. We fix a binder which overlaps its useful purpose of pressure upon the umbilicus and seriously hampers the free movements of the lower chest and of a great part of the abdomen. Thus we stretch and weaken the already feebler part of the abdominal walls, we remove from them the support of the flexed thigh, and make the delicate inguinal regions bear the brunt of every cough, and cry, and varying distension of the gut. We help the possible evil results of a tardy development, and find that the common hernia in the male "occurs with extraordinary frequency in the first year of life.

The immunity as life goes on is no less striking. The boyhood and youth of the native are brief; puberty comes quickly under a fierce sun, and before our own children have well left school he is already taking upon himself the duties and responsibilities of the man. During all this time there is no very apparent reason why he should be free from inguinal hernia. Rather to the contrary. The young boy, with maize as the staple of his diet, grows a huge belly, out of all proportion to the rest of his body. The abdominal walls seem stretched almost to bursting point, and the resolved pressure together with the direct weight of the abdominal contents upon the inguinal regions are still further increased by the greatness of the lumbar curve, a greatness which is partly characteristic of the negro's build and partly exaggerated by the throwing back of the upper part of the trunk as counterpoise to the anterior weight of the intestines and omentum below. Again, throughout life his food supply is always fluctuating. At one time the abundant crops of the rainy season and all the prodigal fruits of his clime, at another time famine, when the precious store of seed corn is hardly spared and a mere sustenance eked out by the leaves of the forest and the roots of the bush; at one time a perfect picture of rotund well-being, at another time a ghastly model of skeletal anatomy. And rapid variations in the viscera and parietes such as these favour, we believe, the occurrence of rupture.

Why, then, his protection? The explanation may lie in two points. In the first place, the native is a practical believer in the doctrine of conservation of energy. He rarely puts to its full use any coordinate group of muscles. He objects to the rigid fixation of any part of his frame as the preliminary

to exercise of power, but depends for his efforts rather upon balance and the press of his body mass. There is all the difference in his actions as between the cricketer's stubborn, muscular drive, and the lithe, weight-transferring swing of the golfer. And so there are wanting those violent contractions of the trunk muscles which are so fruitful an exciting

cause of hernia with us.

Secondly, and chiefly, a great deal must ensue from the position the native takes up when sitting, and especially when disposing himself to the necessary eliminatory functions. He squats down upon his heels like a huge grasshopper, with the back of the thigh touching the calf, and the body swayed forwards to the full flexion of the hip; a posture we have so far forgotten that it is not only uncomfortable but even difficult for the civilised man to imitate it. Yet the black, under these circumstances, does entirely what is most wanted and which we most neglect-he supports to the greatest possible extent, and at the time when it is most needed, those portions of the abdominal wall which are especially patent to the dangers of strain.

Syphilis is a disease of which all travellers assume a knowledge, even if they have it not. The usual reports of its universality were perceived and believed until the village of Maponda, at the southern extremity of Lake Nyasa, was reached. This has the reputation of being the most immoral village in this part of Africa, and was described as "simply rotten with syphilis." Immoral it certainly is. The people devote themselves for the most part to dancing, pombé drinking, and general licence. Every night and all night, from sunset to broad dawn, the tom-toms and zuzes are going ahead, with screechings, songs, and general hubbub as accompaniment. The unyago, or initiation dance with all its promiscuous attendances, is still carried on.

"Gather ye roses while ye may, Old time is still a-flying,"

and a distorted version of the injunction to take no thought of the morrow, sum up the philosophy

of life at Maponda's.

Syphilis then, did it exist, would be general. It would quickly become general if introduced into any of the native tribes, for pipes, food vessels, and drinking calabashes are used and passed round quite in common. No convincing evidence of the disease, congenital or acquired, was found either at Maponda's or at any point reached during our march, which, be it remarked, however, did not touch Karonga, or any other station inhabited by, or under direct control of, the Arabs.

One case of ulceration of the vulva was met with, in which the sores were almost phagedænic in virulence, but everything cleared up under rigorous local antiseptic measures, and there were no subsequent results from constitutional mischief. So with several sores on the penis, which hardened up. Induration, we are apt to forget, may result from other causes than syphilis, and these softened and healed under application of pure carbolic acid, followed by dust-

ings with iodoform.

Now scabies, on the other hand, is exceedingly common, especially on the Lake shore at points most

frequently visited by the white man, and a false deduction drawn from the skin rash is probably at the bottom of the error regarding syphilis. fusion, too, may have arisen from the custom prevalent among some tribes of filing the teeth, one favourite pattern reproducing the position although exaggerating the size of the Hutchinson notches. Even a more critical observation might be deceived, for fever subjects, after unsuitable diet and long residence in unhealthy districts, may suffer from sores which are typically rupial in appearance. Examples were seen, both in blacks and whites, in whom a venereal taint could be absolutely negatived.

It is curious that no traces of syphilis presented themselves. Opportunities of infection there must have been in plenty, for near and through this country, until very recent times, lay the great slave routes between the interior and the East coast where

syphilis is rampant.

Livingstone's remark upon this subject is interest-"A certain loathsome disease, ing. He says, which decimates the North-American Indians, and threatens extirpation to the South Sea Islanders, dies out in the interior of Africa without the aid of medicine. And the Bangwakatse, who brought it from the west Coast, lost it when they came into their own land south-west of Kolobeng. It seems incapable of permanence in any form in persons of pure African blood anywhere in the centre of the country. In persons of mixed blood it is otherwise; and the virulence of the secondary symptoms seems to be, in all the cases that came to my care, in exact proportion to the greater or less amount of European blood in the patient. Among the Coronnas and Griquas of mixed breed it produces the same ravages as in Europe; among half-blood Portuguese it is equally frightful in its inroads on the system; but in the pure negro of the central parts it is quite incapable of permanence." So much for Livingstone's observations; and, passing through the country through which he travelled, I humbly beg to corroborate this great man's statements, and to agree relatively, though not perhaps absolutely, with his final conclusion.

It has been stated that there exists an antagonism between malaria and tuberculosis; that they are mutually exclusive; or, for the purpose of our argument, that tuberculosis does not occur in a malarious country, by reason of the very presence

therein of the malaria.

The possibility of such opposition between the two most common organisms that prey upon ourselves is certainly fascinating, and for this reason, perhaps, the argument crops up with commendable regularity, despite the negative conclusion of advanced evidence. First formulated by Wells, and supported by Schönlein, it was keenly analysed by Boudin, who arrived at the deduction that "in localities where malarial disease is endemic, phthisis is rarely or never seen among those of the inhabitants who have been continuously or for a long period exposed to the malarious influences.

Taking for a moment the general proposition, the idea of direct antagonism between the two diseases has been gradually but steadily assailed. white men die in malarious Africa from pulmonary tubercle. In England, malaria was at one time very prevalent in London, until the drainage of certain marshes led to its disappearance. Plymouth, Stourport, Bolton, and other towns are noted by Sydenham as dangerous fever spots, and yet we have no knowledge that at this time tuberculosis was any the less rampant than it is now. Again, since the advance of bacteriological knowledge, the plasmodium of malaria and the tubercle bacillus have been frequently demonstrated active at the same time in the same individual.

Certainly, tuberculosis is a rare lesion in South-East Central Africa, but it is so because of the general climate and configuration of the country. An elevation of 2,000 to 5,000 feet above sea-level, a clear and uncontaminated atmosphere, with an essential out-door existence, temperature showing an average shade maximum of 87 degrees and a minimum of 61 7 degrees, unclouded skies and a great amount of direct sunshine, are conditions by no means favourable to the growth of its specific organism. It does occur, however, among the natives. The following are examples of different phases in which it presented itself:

(a) A case of advanced caries in lower dorsal region, with fluctuation on either side of spine.

(b) Tubercular glands in neck, the nature of which was rendered still more evident, in one case, by their

(c) Several cases of cured hip disease, with typical histories and scars of healed sinuses.

(d) A certain chief, who had consolidation of both

apices and all clinical signs of phthisis.

In many cases of continued fever, in cases of slight persistent pain, or of marked inflammatory mischief of the lungs or abdominal viscera accompanied by pain, cupping is largely resorted to. The operation is beautifully done by the native medicine man, and stoically borne by the patient. The modus operandi is as follows: The skin over the spot selected is covered with oil, or this being wanting, the few drops of blood first drawn are used for the adhesive purpose. Incisions are then made well through the skin with a sharpened knife or assegai point, care being taken that the series shall form, when complete, a pattern or figure. A cow's horn is pressed firmly down with its base encircling the whole, and the "doctor" encourages the flow of blood by sucking away and exhausting the air through a hole bored in its tip. The total quantity withdrawn is not excessive; six to eight ounces would be the limits of the average.

The whole performance is a leisurely proceeding, just tinged with the necessary suggestion of mysticism and of marvellous skill. This and the shedding of the blood render it a great open-air entertainment for the people of the village. In another light, the whole thing, in certain ways, offered an irresistible caricature of the pomp and circumstance

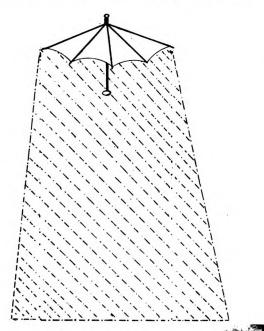
of many a modern antiseptic crusader.

The patient's chief concern after recovery is concerning the fate of the scars. These are encouraged as a rule to excessive formation of scar tissue by the rubbing in of certain "medicines," or of finely powdered wood-ashes. Cicatrices in the black seem always to have a tendency to become keloid, and with them the keloid never takes on malignant tendency. Great hard plaques, knotted and gnarled, the result of burns, and fit for illustration of the subject, are regarded with pride by their owners, and many also are seen, especially across the chest, whose greater symmetry confirms their production by design. In face of the unvarying and continued innocence of such it is interesting to analyse our own suspicions of these growths.

Still more to be remarked is the fact that malignant tumours, either of epithelium or of connective tissue, occur so very rarely in this primitive part of Africa, that they may be said to be unknown. A quarter of a century's missionary practice in the Shire Highlands and upon the shore of Lake Nyasa has given the Rev. Dr. Laws a solitary case of tumour of the parotid gland, which recurred after removal, and which had at least all the macroscopic appearances of a malignant growth. A second case of a possible epithelioma of the tongue is on the doubtful list. These stand out alone as the result of a vast experience.

Many causal deductions might be made—all futile in the present state of our knowledge. But perhaps there is no greater contrast, no fact more provocative of thought, especially to us in cancerous Liverpool, than this remarkable absence of malignant disease among the natives of the Nyasaland Plateau.

#### PORTABLE FOLDING MOSQUITO NET.



WE are indebted to P. Carmody, F.I.C., F.C.S., Government Analyst and Professor of Chemistry, Trinidad, B.W.I., for the note and sketch regarding the portable folding mosquito net.

To the Editor of the Journal of Tropical Medicine.

SIR,—I beg to submit a rough sketch of a portable folding mosquito net designed for the use

of travellers in the tropics. It is either attached or attachable to the ordinary linen umbrella which forms a part of every tropical outfit, and the combination affords protection from the sun during the day and from mosquitoes during the night. The design has been registered recently.

I remain, &c., P. CARMODY.

## Current Miterature.

THE COMPARATIVE PATHOLOGY OF THE JEWS .-It is difficult to obtain exact data concerning the vital and pathological statistics of the Hebrew race. Several, however, are fairly well established, and the following statement, made by Dr. M. Fischberg in the New York Med. Journ. of April 8, 1901, is of interest. The death-rate amongst Jews is lower than that of their neighbours of any nationality. The marriage and birth rates are lower than in the case of Christians; the increase in numbers being therefore due to less loss by death, and by bringing more children to maturity. Jews suffer less from several infectious diseases such as cholera, smallpox, and tuberculosis, than their neighbours. Syphilis in Jews is relatively rare; probably due to circumcision, but possibly also to other obvious reasonsselection, &c. Alcoholism is also rarely met with amongst Jews. All organic nervous lesions are infrequent, due, no doubt in a great measure, to the The ailments absence of syphilis and alcoholism. to which Jews are peculiarly liable are: Diabetes, functional neuroses, insanity, idiocy in children, glaucoma, hernia, varicose veins, and hæmorrhoids.

Jews attribute their immunity to certain prevalent diseases to the care with which they prepare and dress their food. That this has directly to do with the immunity in Western Europe may be called in question; but that the general attention paid to their food and hygiene generally, as betokened by the rules they follow in preparation, plays an important part is very probable.

A URIC ACID SOLVENT.—Urosin.—A combination of  $7\frac{1}{2}$  grains quinic acid,  $\frac{1}{2}$  grain carbonate of lime, and  $4\frac{1}{2}$  grains of pure white sugar in the form of tablets, and styled urosin tablets is highly spoken of in certain quarters as a uric acid solvent. Uric acid, which is so insoluble in water (1 in 14,000), is changed into benzoic and then into hippuric acid in the urine. Hippuric acid is soluble in the proportion of 1 to 600 of water. One to two tablets may be given three or four times a day.—Therapist, June 15, 1901.

TEARS AS A REMEDY.—In Persia the tears bottled at funerals and during mourning for the dead possesses, in the opinion of natives, a therapeutic value. The tear-shedders are each given a sponge to mop face and eyes, which is afterwards squeezed and the tears preserved in bottles. The ailments for

which they are exhibited are not mentioned.— Therapist, June 15, 1901.

Medical Practice in Thibet.—Dr. Susie C. Rignhart, in her book "With the Thibetans in Tents and Temple," describes some of the medical practices she observed amongst the Thibetans:— "For headache, large sticking plasters are applied to the patient's head and forehead; for rheumatism, often a needle is buried in the arm or shoulder; a tooth is extracted by tying a rope to it and jerking it out, sometimes bringing out a part of the jaw at the same time; a sufferer with stomach-ache may be subjected to a good pounding, or to the application of a piece of wick soaked in burning butter grease. If medicine is to be taken internally, it will consist probably of a piece of paper on which a prayer is written, rolled up in the form of a pellet, and, if this fails to produce the desired effect, another pellet is administered composed of the bones of some pious priest."

Major Ronald Ross's Expedition to West Africa.—On June 15, the fifth "malarial" expedition sent out by the Liverpool School of Tropical Medicine sailed in the s.s. Axim from Liverpool. Dr. Logan Taylor accompanies Major Ross, F.R.S. The expedition started under the happiest auspices, many friends assembling to say good-bye and to wish God-speed.

We wish to add our good wishes for the success of the expedition, and for the safe return of Major

Ross and his coadjutor, Dr. Taylor.

The Section of Tropical Medicine, at the British Medical Association meeting in August at Cheltenham, will be, by Major Ross's journey to West Africa, deprived of the presence of its distinguished President.

No Leprosy in the Faroe Islands.—We are assured on excellent authority that there is no leprosy in these islands, and that there is no history of there having ever been a leper home there. Since leprosy prevails so extensively in the neighbouring countries of Iceland and Norway, it becomes of much interest to ascertain what conditions have conduced to its extinction in the Faroes. In the Orkneys and Shetlands, where leprosy was formerly prevalent, it has become extinct within recent times.—The Polyclinie, June 1, 1901.

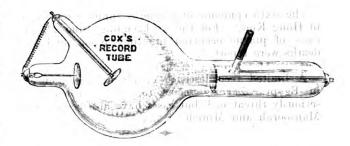
A New series of articles, dealing with the practical side of microscopy, together with notes and queries, correspondence, and description of new apparatus, are appearing each month in *Know-ledge*, under the editorship of M. I. Cross, joint-author of the well-known handbook, "Modern Microscopy."

THE RÖNTGEN RAYS AS A MEANS OF TREATMENT IN LUPUS, &c.—In addition to its value in diagnosis the Rontgen Rays are being seriously considered and applied as a remedial measure in several diseases. Electric light has increased our therapeutic resources in a marked manner, and now the

judicious application of the Röntgen Rays claim to possess a therapeutic power of considerable effectiveness. No medical man now-a-days considers his equipment complete unless he can avail himself of the diagnosis which is frequently alone possible by means of the Röntgen Rays, but the expense of the apparatus is a great drawback. When, however, in addition to the X-ray apparatus the cost of an electric light is added, the individual medical practitioner finds himself handicapped indeed. Were, however, the Röntgen Rays proved to possess a value in the treatment of similar diseases to those which electric light is being applied, the matter would be considerably simplified. A medical man practising in a British Colony may well hesitate to request the Government of the Colony to go to the expense of a Röntgen Ray and of an electric light apparatus as well, but he will be only doing his bare duty to demand that the X-ray apparatus be obtained, and more especially if he can not only diagnose but also treat diseases by its application. Lupus is the disease in which electric light is being particularly applied, but others are hoped to be brought within its power, and especially are malignant growths placed within this category.

We have had no official report of leprosy being systematically treated by electric light or by Röntgen Rays, but we hope soon to hear of its being so.

To further these ends, Messrs. Harry W. Cox, Ltd., Electrical Engineers, of Cursitor Street, Chancery Lane, London, have applied themselves, and the result appears excellent. The firm has adapted an apparatus to be used with the Röntgen Rays for treatment of lupus, &c., which costs much less than the electric light apparatus, which need be applied for fifteen minutes only in place of the two hours required for the light treatment, and which causes no pain or discomfort during application. A medical man therefore, supplied with the Röntgen Ray apparatus, can administer the "light" treatment without the necessity of obtaining a separate plant.



We give an illustration of the "tube" in use by Cox, Ltd. The tube has been approved of by the Röntgen Society, and in fact the gold medal of the Society has been awarded to the "Cox 'Record' Tube," Messrs. Cox are the manufacturers of the apparatus, and by dealing directly with the manufacturer, the medical man can ensure that the articles supplied are genuine.

Hæmoglobinuria.—Ziemann has had considerable experience in blackwater fever, and as a result has come to the following conclusions:—Blackwater

Brooklyn Medical Journal.

fever is not necessarily associated with general hæmorrhagic diathesis. In some districts where malaria prevails, some persons exhibit a liability to blackwater fever after having had one or several attacks of malaria. Ordinary tertian or quartan fever is considered capable of originating blackwater fever, but the predisposition to this is mostly possessed by persons who have had tropical or æstivo-autumnal fever.

Ziemann is of opinion that blackwater fever may ensue, (1) as a consequence of a fresh attack of malaria; (2) as a consequence of a fresh attack of malaria, especially when quinine has been used; (3) in persons with a predisposition to blackwater fever it may be provoked by the use of quinine, even without a fresh attack of malaria; but this is of rare occurrence, for Ziemann has observed black-water fever in the negroes of Tagos and elsewhere who have never taken quinine.

In very mild cases the disease is only indicated by a slight brownish hue of the urine. In one case, complicated with tropical malaria,  $\frac{1}{18}$  grain of quinine produced albuminuria, and  $\frac{1}{6}$  grain of quinine produced hæmoglobinuria.—Deutsche Med. Wochenschrift.

#### PLAGUE.

CAPE COLONY.

Since the commencement of the outbreak of plague in Cape Town, 735 persons have been attacked by the disease, of which number 354 ended fatally. A few plague cases have occurred at Simonstown and at Port Elizabeth, but with these exceptions the disease has not spread much beyond Cape Town.

INDIA.

The number of deaths from plague in all India during the week ending June 8, amounted to 829, about half the number for the previous week. In all parts of India, except in the Mysore district and in some of the districts on the Punjaub and Cashmere frontiers, the virulence of plague is subsiding for the time being.

Hong Kong.

The sixth epidemic of plague is running its course in Hong Kong. For the week ending June 22, 155 cases of plague occurred in Hong Kong, and 152 deaths were reported.

EGYPT.

A limited recrudescence of plague has occurred in Egypt. Zagazig seems to be the town most seriously threatened, but cases have also occurred at Mansoorah and Minieh.

#### EXCHANGES.

Annali di Medicina Navale. Archiv für Schiffs u. Tropen Hygiene. Archives de Medicine Navale. Archives Russes de Pathologie, de Médec., Clinique et de Bacteriologie. Australasian Medical Gazette. Boletin de Medicina Naval. Boston Medical and Surgical Journal. Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology

British Medical Journal.

Climate. Clinical Journal. Clinical Review. Giornale Medico del R. Exercito. Hongkong Telegraph. Il Policlinico. Indian Engineering. Indian Medical Gazette. Indian Medical Record. Journal of Balneology and Climatology. Journal of Laryngology and Otology. Journal of the American Medical Association. La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal. Medical Brief. Medical Missionary Journal. Medical Record. Merck's Archives. New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyclinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo. The Hospital. The Medical and Surgical Review of Reviews. The Northumberland and Durham Medical Journal. Treatment.

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Quarter page..

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2.—Manuscripts sent in cannot be returned.

3.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

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## The Journal of Tropical Medicine.

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In order to meet the constant enquiry for addresses of respectable firms catering for the various requirements so difficult to obtain abroad, we give a list of names and addresses which we trust will be found useful to our numerous correspondents and subscribers.

## Original Communications.

THE CLASSIFICATION OF MOSQUITOES.\*
By F. V. Theobald, M.A., F.E.S.

The mosquitoes, gnats, or Culicidæ were originally all contained in four genera—Culex and Anopheles, Ædes and Corethra. Of these even now there are only two groups referred to in medical journals (Culex and Anopheles). The genus Culex has been a sort of harbour of refuge for all Culicidæ except Anopheles and the large Megarhinus and Ædes, and contains many forms quite as diverse from one another as Anopheles are from Culex; some even more so. It is thus very important from a practical point of view in connection with the malarial question to sift and sort out and to arrange these various so-called Culex, many of which are generically quite distinct from the typical Culex, such as our European C. pipiens of Linnæus and the tropical and subtropical C. fatigans of Wiedemann.

If there are sufficient differences between these old *Culices* to be of generic importance scientifically, there may be and probably are very important internal structural and physiological deviations.

At present all the blame of malaria-carrying is placed on members of the genus Anopheles. It has been said more than once that Culer does not do so. What Culex have been experimented with? C. fatigans, Wiedemann; C. annulatus, Meigen; C. pipiens, L.; C. penicillaris, Rond; C. pulchritarsis, Rond; C. vexans, Meig.; C. nemorosus, Meig.; C. albopunctatus, Rond; C. spathipalpis, Rond; C. hortensis, Fic.; Tæniorhynchus Richardii, Fic.; Stegomyia fasciata, Fab., and Ædes; all these are true Culex. But many species that have been considered as such I find are very different. These I have raised to distinct genera, and from what we

know of some of these new genera they have very different life-histories to *Culex* proper. Before we can place all the blame on *Anopheles* we must see if any of these new groups can serve a similar obnoxious and posterior cross-veins. But too much reliance *rôle*. Hence to-day I am going to try and point out the characters by which the old and the new genera of the *Culicida* can be distinguished.

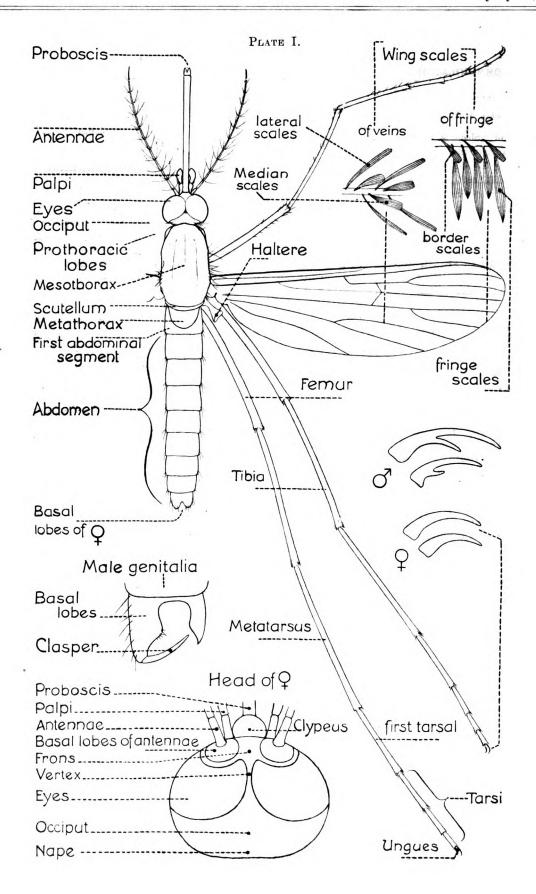
In formulating the new genera, and in, to some extent, re-modelling the old, I have made most use of the scale structure. The palpi and ungues which have been used as generic characters by Arribalzaga, have had to be discarded. Not until I had examined some thousands of specimens, embracing three hundred odd species from different parts of the world, did I decide upon any general grouping of these pests, but after due consideration I found the scale structure was the only one upon which I could form a satisfactory division of these insects; other characters, such as palpi, ungues, &c., being seen to be of specific but not of generic value.

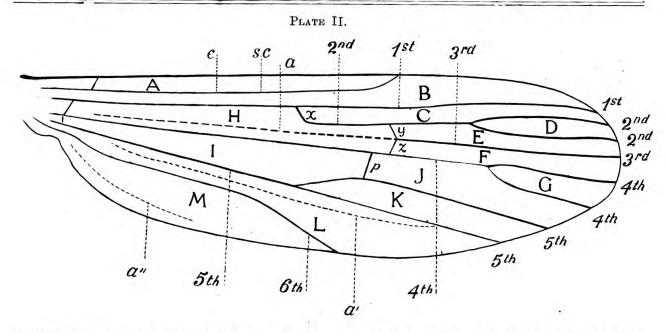
It is therefore necessary to explain the general structure of a typical mosquito and the scales which cover it, and which give the creatures their often gorgeous colours.

The mosquito, like any other hexapod, can be divided into three main parts—(1) the head, (2) the thorax, and (3) the abdomen.

(1) The head bears on its lateral halves a pair of compound eyes, reniform in shape, a pair of jointed antennæ, pilose in the female, plumose in the male, these are not subject to much variation, but a few very important modifications appear upon which two new genera have been formed (Deinocerites, Theo., and Brachiosoma, Theo.) Of the mouth parts I need only speak of the palpi, as they vary tremendously. In the female they may be long (Megarhinus and Anopheles), or short (Culer, Edes, Stegomyia, &c.). In the male also they may be either long (Culex, Anopheles, &c.) or short (Edes, Uranotænia, Wyeomyia, &c.). The numbers of joints vary from two in Edes to four in Anopheles, or five in Megarhinus. These joints are generally difficult

<sup>\*</sup> A lecture given at the London School of Tropical Medicine.





to see in museum specimens. There are also constrictions towards the base of the palpi which have been erroneously taken for joints. Too much importance should not be attributed to joints in palpi, as they are liable to cause grave errors, being covered with scales which hide the segmentation. With regard to the thorax we find all three divisions present, but the main area is the mesothorax, the prothorax being reduced to a pair of lobes, and the metathorax is very small and nearly always nude. Between the meta- and meso-thorax comes a plate, the scutellum, which is usually trilobed (Culer, Stegomyia, &c.), but may be simple (Anopheles). The thorax bears a pair of wings and the six jointed legs attached to the lower lateral surfaces, the pleuræ.

The wings have the veins and the whole border covered with scales, which are of generic importance, while the venation is also of great use in classification. On the wing field are six longitudinal veins. There is one surrounding the border of the wing called the costa, the others are spoken of as the first, second, third, and so on, longitudinal veins; the second and fourth longtudinal veins are forked apically, the forks forming respectively the so-called first submarginal cell and the second posterior cell. In some genera the "fork-cells" are very small (Megarhinus, Uranotænia), in others long (Culex and Anopheles). Between the long veins we find transverse or cross-veins; those of special classificatory value I find to be the supernumerary, middle, and posterior cross-veins. But too much reliance must not be placed on them as their is some variation in their relative positions even in the same

Of the legs I need say but little. The joints are known as the coxa (basal), trochanter, femora, tibia, and tarsi; the latter being five in number, the first being often spoken of as the metartarsus. The relative length of some of these joints may serve as a guide to separate two closely related species. The femora are swollen in some genera (Uranotania and Anopheles). The ungues or claws also offer

specific distinctions; in the female they are always equal, usually simple, but they may be uniserrated; in the male, the fore and the middle are always unequal, both may be uniserrated, and the larger one bi- or even tri-serrated; in a few they are simple, the posterior pair are always equal and simple, and usually small. I can detect no variation in these in any one species.

The abdomen presents no points of value save the genitalia of the male. The latter differs in most species, and in some cases are peculiarly modified. The so-called hypopygium consists of a pair of basal lobes and two claspers, which vary in form and arrangement.

Such briefly are the chief external structures of a mosquito that are of systematic value.

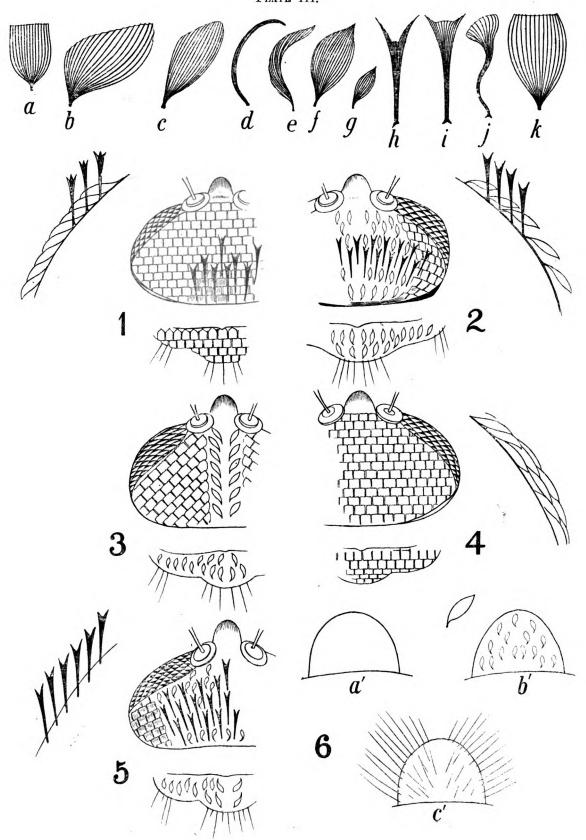
Scales.—Head, palpi, part of the thorax, abdomen, legs, and wings are covered more or less completely with scales. These scales may assume very various forms (Plate 3, figs. a to k), but they may be reduced to about six well-marked types on the body and head of the mosquito.

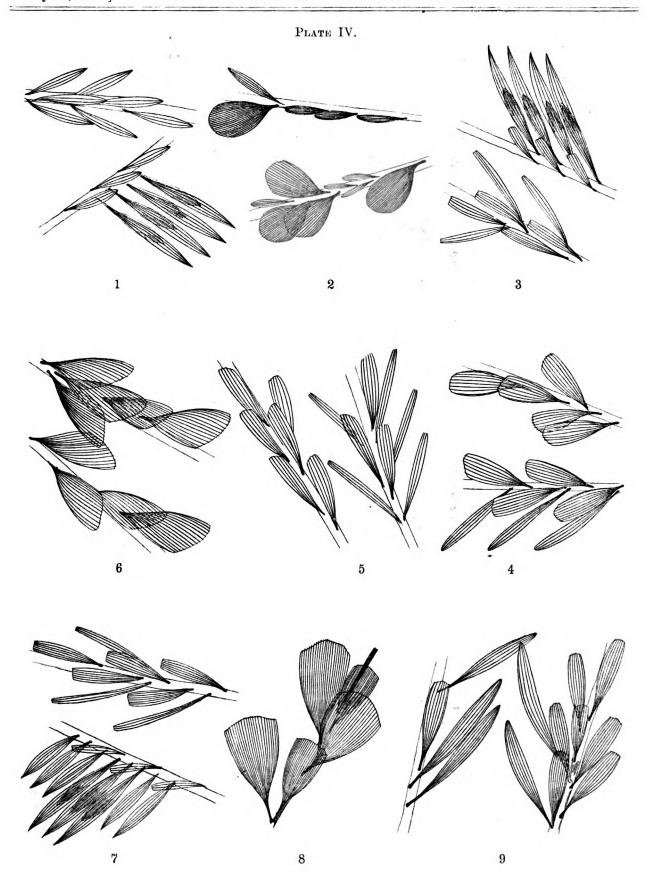
These I have called by the following names:—
(1) Narrow curved scales (e); (2) spindle-shaped curved scales (f); (3) upright forked scales (h and i); (4) spade-shaped scales or broad flat scales (a); (5) long twisted scales (j); (6) narrow hair-like curved scales (d).

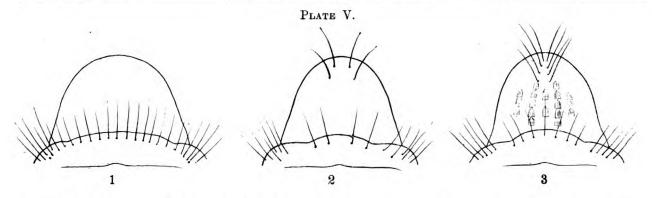
Really all the scaly covering to the head, thorax, abdomen, palpi, and legs can be reduced to one of these six types. On the wings we get other modifications; the scales may be (1) linear and narrow; (2) elongated oval; (3) lanceolate; (4) pyriform (k); (5) spatulate; (6) or asymmetrically broadened (b and (c)).

The arrangement of the scales on the head in a typical Culex (Plate 3, fig. 2) is as follows: Narrow curved scales all over the occiput; upright forked ones, especially thick towards the nape, and flat ones on each side of the head. The thorax is more or less densely clothed with scales; in one type they are all narrow curved scales or hair-like or spindle-shaped scales on both the mesothorax and the

PLATE III.







scutellum; the metanotum is always nude in typical Culex and Anopheles (vide Plate 5). The legs are also completely covered with scales, which usually lie close together and overlap like the tiles on the roof of a house; they are normally small and spatulate in form and closely applied to the surface, but they may become elongated and erectile, or form dense tufts, giving the legs a thickened appearance (Janthinosoma), or even forming dense paddle-like patches (Sabethes).

The abdomen in most Culicidæ, save Anopheles, is covered with flat spatulate scales which form a complete covering. These offer little of systematic value, but in some genera the scales of the abdomen become rather elongated and erectile, and give the body a rough appearance (Mucidus), and in others certain parts may be densely scaled with long narrow scales forming a kind of caudal fan (Megarhinus, &c.).

On the wings we find scales of quite different form to those of the body. Each vein has two, three, four or more series of scales attached, which vary in form in the different genera. These scales are usually spoken of as (1) median vein scales, (2) lateral vein scales. In Cules the former are usually moderately broad, symmetrical, short or elongated scales ending convexly or flat, the lateral vein-scales in Cules are thin, linear, straight, or bent squamæ (Plate 4, fig. 7).

The wing fringe is composed of three or four sets of scales, the fringe-scales being long, of three sizes, and lanceolate, and along the border of the wing a third or fourth series of smaller scales, the border-scales of systematic value.

The genera first formed for Culicidæ were Culex and Anopheles, Ædes and Corethra. The genus Culex was instituted by Linnæus in 1790, and was apparently founded on Culex pipiens; Anopheles by Meigen in 1818, and also Ædes and Corethra.

In 1827 Robineau Desvoidy, in his "Essai sur les Culicides," instituted three new genera, Megarhinus, Psorophora, and Sabethes. Low, in 1844, placed Mochlonyx as a distinct genus.

Not until 1891 was any fresh tabulation of the family attempted. In that year Arribalzaga separated from Culex the genera Janthinosoma, Taniorhynchus, Ochlerotatus, and Heteronycha; and from Edes the genus Uranotania. Another genus related to Edes was formed by Williston, Hamogogus, for a single St. Vincent species.

Of these genera I have retained Culex, Anopheles, Megarhinus, Sabethes, Psorophora, Janthinosoma, Taniorhynchus, Uranotania, Hamagogus, Ædes, Corethra, and Mochlonyx. But the characters of the genera have been somewhat modified.

The characters of the genera were mainly based on the proboscis and palpi, but into this old classification I need not now enter.

To these old genera I now add the following:— Cycloleppteron, Toxorhynchites, Mucidus, Eretmapodites, Stegomyia, Armigeres, Deinocerites, Panoplites, Wyeomyia, Ædeomyia, Trichoprosopon, and Brachiosoma.

The characters of these and the old genera are as follows:—

Section A.—Proboscis formed for suction; metanotum nude (Plate 5, fig. 1).

(a) Palpi long in the male.

Genus 1. Anopheles (Meigen).—Palpi long in both sexes, usually clubbed in the male. The head clothed almost entirely with large upright forked scales, a few narrow curved ones, and flat lateral ones (Plate 3, fig. 5). The thorax has usually narrow hair-like curved scales, but in some species they are spindle-shaped, the scutellum round or slightly trilobed with narrow curved scales, the abdomen usually nude of scales, but they may be present in the form of narrow spindle-shaped ones. The wing scales are rather long and lanceolate or narrowly spindle-shaped (Plate 4, fig. 1). The larvæ have no respiratory tube and lie horizontally in the water.

Genus 2. Cycloleppteron (Theobald).—Closely related to Anopheles and separated from it by the presence of deep inflated wing scales in patches, forming more or less black spots (Plate 4, fig. 2).

(b) Palpi long in male, shorter in female; first submarginal cell very small; proboscis bent (Megarhinina). Palpi five-jointed in female (Megarhinus); three-jointed in female (Toxorhynchites).

Genus 3. Megarhinus (Rob. Desvoidy).—Scales of the head are all arranged like tiles on a roof, flat (Plate 3, fig. 4); thorax with spindle-shaped and broad scales over the wings; scutellum with broad scales; caudal tuft present on last few apical abdominal segments. Larvæ large with respiratory tube.

Genus 4. Toxorhynchites (Theobald).—Venation and scale structure like the above, but the female palpi three-jointed and short.

(c) Palpi short in the female, long in the male; first fork-cell long (Culicina). In this group the

cross-veins and wing scales form the chief distinctive characters.

(d) Legs more or less densely scaled.

Genus 5. Sabethes (Rob. Desvoidy).-Mid crossvein nearer apex of wing than supernumerary; posterior cross-vein nearer apex than midde. Legs with dense paddle-like areas of long scales.

Genus 6. Janthinosoma (Arribalzaga).—Crossveins as in Culex; hind legs densely scaly; the scales

on the thorax broadly spindle-shaped.

Genus 7. Psorophora (Rob. Desvoidy).—Posterior cross-vein nearer the base of wing than the mid cross-vein; wings with thin scales; legs densely scaled. Thorax with lines of small spindle-shaped

Genus 8. Mucidus (Theobald).—Posterior crossvein nearer apex of wing than mid.; wings with large pyriform and large spatulate scales, mostly parti-coloured (Plate 4, fig. 8). Thorax and head with long twisted upright scales giving a mouldy appearance (Plate 3, j).

Genus 9. Eretmapodites (Theobald).-Posterior cross-vein nearer base of wing than mid cross-vein; wings with rather long thick scales (Plate 4, fig. 4); legs in male with dense apical paddle. Scales of the

head flat and also scutellum.

(e) Legs uniformly scaled with flat scales.

Genus 10. Stegomyia (Theobald).—Head and scutellum with flat scales; head with upright forked ones as well (Plate 3, fig. 1). Wing scales small, both spatulate and linear (Plate 4, fig. 5); fork-cells rather small. Palpi of male with more or less tufts of hairs. Larvæ with short respiratory siphon; eggs often laid separately.

Genus 11. Armigeres (Theobald).-Like above, but the male palpi rather long, thin and nude. Large species. Scales on head narrow and curved, upright forked ones, and broad flat lateral ones. Head and scutellum with narrow curved scales.

Genus 12. Culex (Linn.)-Wing scales small, lateral ones linear. Head and scutellum with scales as in Plate 3, fig. 2.
Genus 13. Panoplites (Theobald).—Wing scales

mostly broad and asymmetrical (Plate 4, fig. 6).

Genus 14. Twniorhynchus (Arribalzaga).-Wing scales dense, mostly elongate, oval, or broadly lanceolate.

Genus 15. Deinocerites (Theobald).—Second antennal joint very long, nude. In all the other Culicina it is rather small.

Genus 16. Brachiosoma (Theobald).-Second antennal joint long; the greater part of antennæ densely scaly.

(f) Palpi short in both sexes (Edeomyina).

(g) Palpi two- or three-jointed, non-metallic.

Genus 17. Ædeomyia (Theobald).-Wing scales large and flat (Plate 3, c); fork-cells normal.

Genus 18. Ædes (Meigen). - Wing scales small, linear like Culex; fork-cells normal.

(h) Palpi five-jointed.

Genus 19. Hæmagogus (Williston).—Metallic; fork-cells normal.

(i) Palpi two-jointed.

Genus 20. Uranotænia (Arribalzaga).—Fork-cells very small; metallic; flat scales in spots on thorax. SECTION B .- Proboscis formed for piercing; Metanotum with chætæ; palpi small.

Genus 21. Wyeomyia (Theobald). — Proboscis

moderately or very long.

Section C.—Proboscis formed for piercing; metanotum with chætæ and scales.

(Theobald).—Palpi Genus 22. Trickoprosopon short in female; long in male.

D.—Proboscis short; not formed for piercing (Corethrina).

Genus 23. Corethra (Meigen).—Metatarsus longer

than first tarsal joint.
Genus 24. Mochlonyx (Low).—Metatarsus shorter than first tarsal.

#### DESCRIPTION OF PLATES.

#### PLATE I.

TYPICAL PARTS OF MOSQUITO.

#### PLATE II.

#### WING OF CULEX.

c, costal vein; s.c, sub-costal; 1st to 6th, first to sixth longitudinal veins; a, a', and a'', increasations (a' called by Austen the 6th vein, a'' the 8th); y, supernumerary cross-vein; z, mid-cross vein; p, posterior cross-vein; A, costal cell; B, sub-costal cell; C, marginal cell; D, first sub-marginal cell; E, second sub-marginal cell; F., first posterior cell; G., second posterior cell; J, third posterior cell; K, anal cell; H, first basal cell; I, second basal cell; L, auxiliary; M, spurious cell.

#### PLATE III.

HEAD AND SCUTELLAR ORNAMENTATION IN CULICIDÆ.

(1) Head, scutellum, and lateral view of head scales in Stegomyia (Theo.).

(2) Head, &c., in Culer (Linn.).
(3) , Ædes (Meigen).

- Megarhinus (R. Desv.). (4) ,,
- Anopheles (Meigen). Clypeus of a' Culex, b' Stegomyia (Theo.), and c' Trichoprosopon (Theo.).
  a to k, Forms of Scales. ,,

(a) Spade-shaped scale.

- Broad asymmetrical winged scale of Panoplites (Theo.).
- (c) The same of Edeomyia (Theo.)
- (d) Curved hair-like scale.
- (e) Narrow curved scale.(f) Spindle-shaped scale.
- (g) Small spindle-shaped scale.
  (h) and (i) Upright forked scale.
  (j) Upright twisted scale.
- (k) Inflated parti-coloured scale.

#### PLATE IV.

## FORMS OF WING SCALES.

- (1) Anopheles (Meigen) vein and fringe scales.
- (2) Cycloleppteron (Theobald) vein scales.
  (3) Janthinosoma (Arribálzaga) vein and fringe scales.
- (4) Eretmapedites (Theobald) vein scales.
- (5) Stegomyia (Theobald) vein scales.
  (6) Panoplites (Theobald) vein scales.
  (7) Culex (Linnœus) vein and fringe scales.
  (8) Mucidus (Theobald) vein scales.
- (9) Psorophora (Rob. Desvoidy) vein and fringe scales.

#### PLATE V.

#### Types of Metanotum.

(3) Trichoprosopon. (2) Wyeomyia. (1) Culex.

NOTES ON CASES OF "SLEEPING SICKNESS" OCCURRING IN THE UGANDA PROTECTORATE.

By J. Howard Cook, M.S., M.B.Lond., F.R.C.S.Eng. C.M.S. Mission Hospital, Mengo, Uganda.

> With preliminary note By Patrick Manson, C.M.G., F.R.S., LL.D.

To the Editors of the Journal of Tropical Medicine.

Dear Sirs,—In sending you an important paper by Dr. T. Howard Cook, on "Sleeping Sickness in the Uganda Protectorate," I would ask you to request your readers in Tropical East Africa to use their opportunities to settle the question of the geographical range of this terrible disease in that part of the world, and, at the same time, to avail themselves of what appears to be a unique chance of ascertaining whether this disease is or is not caused by

filaria perstans.

It is definitely known that sleeping sickness has existed at least from the beginning of last century in West Africa. Apparently until quite lately the area of its distribution was limited. For some time, however, missionaries and others concur in asserting that it is extending to districts hitherto immune, and that this extension is proceeding along the new trade routes which are being rapidly opened out by Europeans. Dr. Sims, of Stanley Pool, informs me that whereas formerly sleeping sickness was unknown at this part of the Congo, it is now extremely prevalent there, and moreover, that within his recollection it has become epidemic in the densely populated valley of the Bangala, a thousand miles up the Congo. He and others tell me that it occurs sporadically as high up the great river as Stanley Falls, where formerly it was unknown. This extension on the Congo is believed to have been brought about by the revolution in travel and multiplication of opportunities of communication entailed by the substitution of steamers for canoes

Dr. Daniels has told us that he heard of the disease near the south end of Lake Tanganyika, a feeder of the Congo, and he mentions the significant fact that he found filaria perstans in a native of that district; whereas, in the many examinations he made of natives of the Shire and Zambesi basins he neither heard of sleeping sickness nor did he once encounter filaria perstans. I have found filaria perstans in many blood films from natives of the Congo basin living at various places on the river at least one thousand miles from its mouth. I have never seen this parasite in a considerable number of blood examinations of natives from tropical East Africa, nor until I read Dr. Cook's paper, had I heard of its occurring in the Nile Basin, or in fact in any part of the eastern watershed of the African continent.

Now it would appear that both sleeping sickness and filaria perstans have shown themselves on the head waters of the Nile and it becomes, considering the deadly character and marked tendency of this disease to spread, a matter of state importance as well as of pathological interest to ascertain if the disease and the parasite, having jumped the watershed, are travelling eastward in company. It may be that, like the jigger, they will over-run East Africa and possibly extend to India and the East. These, and similar problems in the influence of extending communication, the geographical distribution of disease, are of practical as well

as of intense pathological interest.

If in this matter, we would watch with profit the progress of events, it is desirable that the present condition of the natives of East Africa as regards filaria perstans be definitely settled before the sleeping sickness has spread further. If we find that the parasite is absent in districts to which it subsequently spreads concurrently with, or somewhat in advance of, sleeping sickness we will be in possession of a strong argument for regarding the two in the light of cause and effect.

I would therefore request all medical men in those regions

to make systematic examinations of the blood of the natives for filaria perstans and to report the result. Should opportunities for microscopical work be wanting the London School of Tropical Medicine would undertake the examination of any blood films forwarded to it. All that is necessary to secure suitable films is to spread a large drop of blood on an ordinary microscope slip, allow it to dry and then forward it with others in an insect proof and dry box. Fifty or a hundred such films from as many natives would be sufficient to enable us to determine the presence or absence of the filaria in any given district. Yours faithfully,

July 8, 1901.

PATRICK MANSON.

It is now nearly five years since this Hospital was first built and medical missionary work first started in this Protectorate; but until four months ago we had never met with a case of so-called "Sleeping Sickness," or "Negro Lethargy." As this disease is so terribly fatal, so little known except on the West coast of Africa, and its causation at present far from definitely ascertained, the following brief notes may not be out of place as coming from a district where apparently the disease is only just making its appearance. The Mission Hospital contains 66 beds and has a daily dispensary attendance ranging between 150 and 200 patients, chiefly Baganda, but also other races, such as the Bayima, Banyoro, and occasionally Indians and Nubians. Until the present year we had never even heard of the disease as existing amongst the natives here, and were only familiar with it from text-book descriptions. During the last two months no less than seven, with a doubtful eighth case, have come for treatment suffering from this complaint. The natives tell us that the disease is much more frequent in Busoga than in Buganda, and of our eight cases four came from that country: but we have never heard of any widespread epidemic as occurring in this part of the world. We were able to obtain specimens of the blood of seven of the patients, and in five of these the filaria perstans were easily found in the field of blood submitted to the microscope, the other two cases though repeatedly examined both by day and night did not reveal any worm in the peripheral circulation, though I should be loth to hold that they were absent from the circulation; they were at least not so conspicuous in the peripheral circuit, although as will be seen below, the cases submitted to examination were clinically most typical cases of sleeping sickness. But I have observed that the facility with which the worms are found in any one case often varies from day to day, and there is apparently no relation between the condition of drowsiness and the facility with which the filaria is discovered in the peripheral circulation. The Baganda have no name for this disease but merely use the word "kubongota" which means "to nod," or "to be drowsy"; the Basoga, however, have a special name for the disease which they call "Kibongoya," possibly a substantive derived from a verb akin to the Luganda "kubongota." So far from the disease being accompanied by any loss of appetite, one of the natives told me that they diagnosed the onset of the disease by the amount of food ("emere") which the patient consumed. For the notes on Case 1 I am indebted to my brother, Dr. Albert Cook, who also performed the post-mortem examination, and who first

pointed out to me the presence and characteristics of the worm in our first two cases.

Case 1.—Alibayagade. Girl, aged about 11 years. Her home is at Lugumba's on the heights above the lake Victoria Nyanza. She has never been to Busoga, but has lived at Lugumba's all her life. She has suffered from repeated attacks of "fever," measles, "nsundo" (probably generalised warts), chicken-pox, mumps, and smallpox. There is no history of syphilis. Father and mother are living; one brother died, cause unknown. The illness of sleeping-sickness is stated to be unknown in the district from which she comes. Patient was admitted to the Hospital on February 13, 1901. The following are abstracted from the daily notes taken in Hospital:—

H.P.I.—Two months ago she was found by her friend to be ill, shivering and shaking, staggering when attempting to walk, being at all times very drowsy and sleeping most of the day. She was stated to have been ill only one month before her friend

arrived.

February 16.—Specimens of blood taken at 8.30 a.m., 10.30 a.m., 2 p.m., 5.30 p.m., 8.30 p.m., all show the presence of filaria in the blood, the worm showing the following characteristics: It is freely contractile and moves not only on its own axis, but in a time travels through eight to ten fields of the microscope (under a high power); it has a fine whip-like tongue though this is difficult to see; stained specimens show that it possesses no V-spot; its length is fifteen to twenty times the diameter of a red blood corpuscle; its breadth about one-third the diameter of a red blood corpuscle; its tail tapers; the body contents are granular and stain deeply with methylene blue.

N.B.—On February 14 fever parasite of the æstivo-

autumnal type were present in the blood.

March 1.—For the last fortnight the patient had been in an intensely drowsy condition. Sleeps all day and night long (though the actual amount of true sleep was not measured). Can be roused to take her food. If sat up sits for a long time in that position. Feels the prick of a needle. Passes her water under her but knows when she wants to defæcate.

March 5.—Is growing emaciated, cannot stand. Has considerable paresis of limbs. When eating raises the food to her lips in jerks, sometimes not reaching her mouth. Chews very slowly and mechani-

cally. Sits up with marked kyphosis.

March 7.—Patient is quite conscious but apathetic. She passed a motion under her for the first time to-

day.

March 8.—Marked retraction of the head noticed for first time. Lies on the right side; grunts from time to time. Slight nystagmus noticed. No vomiting; bowels costive. Passes much water by day and night under her. Constantly swallowing saliva. Rather, but not very anæmic. No jaundice. Pupils pin-point equal; vision normal. Whole surface of body cold and clammy. Axillary temperature 94°. Chest barrel-shaped. H.A.B. and C.D. not obtained. Abdomen rigid; no ascites; liver and spleen not felt. Sensation apparently poor at extremities, can feel all over proximal part of limbs (loss of sensation is probably due to coldness of collapse). Knee-jerk not obtained; limbs slightly rigid.

Urine as drawn off by catheter, alkaline, cloud of albumen. Pupils insensitive to light. Temperature, irregular course, never over 101°.

Patient died at 5.30 p.m., March 8. Post mortem 7.30 p.m. Body not yet in condition of rigor mortis.

Brain: dura mater slightly adherent in middle line; vessels on dura mater and pia mater not congested; half a fluid ounce of cerebro-spinal fluid at the base of brain. Pituitary body enlarged, but sections were not taken.

Lungs: nil abnormal, no fluid in pleuræ; lungs overlapped the heart more than normal.

Heart muscle flabby, organ otherwise normal.

Body fairly well nourished.

Liver: normal.

Spleen: slightly enlarged, otherwise normal.

Bowels: two ascarides lumbricoides found dead in bowel.

About 13 oz. of fluid found in Douglas' pouch.

During life out of thirteen blood films taken in the "fresh state" the filaria was absent in only one

specimen.

Case 2.—Nasanieri Seputimba. Man, aged about 25 years. Had been a teacher, and was well known in this place as a bright and intelligent man. Was quite well up to three years ago, when he went to Busoga and there contracted his present disease. He describes the onset of his complaint as accompanied by pains in chest and neck, and a chronic cough. To his friends his illness first revealed itself as a gradually increasing drowsiness, rendering his attendance at classes impossible. He has lately lost flesh and become much weaker. Has had comparatively little fever, and no venereal diseases. Had small-pox in infancy. He was admitted to hospital on February 11. The following are taken from notes made on admission:—

General aspect of patient that of listless lassitude; he is so drowsy that one has to ask the same question two or three times over to get a reply, but when given it is consistent and intelligent; he has lost flesh, is pale in the face, and somewhat puffy about the eyes; has a slight cough and expectorates a little mucous, but has never had any hæmoptysis; pulse 128, regular in force and frequence, tension and volume normal; respiration 28, shallow; temperature 99°; bowels costive; tongue moist and furred; throat normal; conjunctiva anæmic; no jaundice; voice is mumbling and indistinct, as if there were a potato in the mouth; feet not swollen; skin is harsh and dry; heart and lungs both normal; spleen and liver are not felt to be enlarged.

February 13.—Patient has an excellent appetite, but complains of pain in chest. Temperature remains normal. Mouth is in a foul state and saliva may now and then be seen dribbling from mouth.

February 14.—5.30 p.m. Filaria perstans found in

February 15.—Ditto at 9 a.m.

February 24.—Patient has a very staggering gait; while walking in the ward he staggered and fell down.

March 3.—Patient is growing very stout. Normally a nice-minded man, to-day he passed his water into his bed in the middle of the Hospital Service; knows that he did so, but evinces no sense of shame.

March 30.—Patient is growing much weaker. He passes both urine and fæces under him, and has had to be moved into the septic ward. Breath very offensive. More drowsy. Marked tremors in limbs. Pulse, however, excellent in quality, and only 100. Temperature has run an irregular course, but never been over 101°.

April 5.-Tongue very tremulous. Speech thick and indistinct. Anæmia less marked under treatment. Patient complains bitterly of cold at night.

April 10.—Pain is complained of specially in legs

and thighs; muscles are obviously tender.

May 3.—Tremors are markedly increasing; pain in limbs better. Urine: colour and odour normal. Sp. gr. 1025. Alkalide on passing. No albumen or sugar. Deposit of phosphates, mucus in suspension.

Knee-jerks are absent. Ankle clonus easily obtained; in spite of absence of knee-jerk skin is very coarse and covered with white lines from scratching. Pupils react to light and to accommodation. Ophthalmoscopic examination reveals a normal fundus and clear media. There is an enlarged gland at the left angle of jaw, and along both sides of neck down the posterior border of sterno-mastoid muscle. Tactile sensation everywhere normal.

May 9.—Patient is obviously slowly sinking. Repeated examinations of blood taken from the finger have lately failed to show the presence of the filaria

that was so easily demonstrated at first.

Case 3.—Sedulaka. Man, about 30 years. Comes from Kyagwe; has never been in Busoga. No other cases of sleeping sickness known in his native place, but he has been to Ngogwe, where other cases have been found. His home is near a marshy river. Admitted to hospital April 20, 1901. He was quite well up to the beginning of March of this year. He too, like the last case was a teacher, and if anything above the average intelligence. He describes his illness as originating in a sense of giddiness. had long-continued hiccough, and was soon noticed to have a staggering gait. No special excess of appetite. No attack of mania or epilepsy. He has not suffered particularly from fever.

P.S. April 20.—Patient has the aspect of lethargy and drowsiness. He answers slowly when spoken to, and speech is indistinct. Tongue is very tremulous, pale and thinly furred. Conjunctiva pale; no jaundice. Pulse 76, regular in force and frequency, medium tension, volume full, moves very slowly, like his speech. Temperature 100.8°. No respiratory symptoms; lungs normal. Heart quite normal. Spleen and liver cannot be felt. On examination of blood both by day and night filaria perstans was found in every specimen examined. Sometimes as many as two worms were found in a single field. They retained their vitality and movements for some hours, but in that time had moved some distance from their original

position.

April 28.—Patient found passing urine into his bed openly. Skin harsh and dry, irritable, but has not many scratch marks. Glands felt in both posterior triangles of neck.

May 2.—Tongue very foul and furred; bowels costive. Lips covered with sordes. Lids droopy. Fine tremors of hands.

Urine: normal colour and odour; reaction neutral; deposits phosphates and urinary epithelium; specific gravity, 1,015; slight trace of albumen; no sugar.

Knee-jerks absent; no ankle clonus. Tactile sense

normal.

May 8.—Up till yesterday patient had had a practically normal temperature, but to-day there is a sudden exacerbation up to 106, and patient is quite unconscious, with deeply stertorous breathing. He died at 11 p.m.

Ophthalmoscopic examination yesterday showed clear media and normal optic discs; fundus normal, except for a glistening appearance of the macula (?

due to hypermetropia), which was present.

Autopsy, May 9, nine hours after death rigor

mortis well-marked.

Brain: dura and pia mater normal; membranes not unduly adherent; vessels at base of brain dissected out and found normal; there was about  $1\frac{1}{2}$ oz. of cerebro-spinal fluid at base of brain; the pituitary body measured 3/4 in. in its longest diameter, from where it left the base of third ventricle to the anterior extremity of the anterior lobe; from side to side the greatest measurement was sin.; from front of anterior lobe to back of posterior lobe was 5 in; the organ was of a congested red colour; it was preserved in strong spirit to be sent to England for examination; the rest of the brain appeared to the naked eye quite normal, as examined in the usual way by sections (macroscopic).

Heart and lungs quite normal; no fluid in the

pleural cavity.

Stomach, duodenum, and small and large intestine normal.

Spleen and liver unduly soft, not enlarged.

Kidneys normal; suprarenal capsules small and

Pancreas normal.

Spinal cord not examined.

Case 4.—Musibike. Girl, aged about 10 years. Admitted to hospital April 25. Patient taken ill six months ago. Her friends describe the onset of the illness as falling into "dalu," a native term used rather vaguely to denote either mania or fits, epileptic or otherwise. On recovery from this patient was noticed to be becoming increasingly drowsy. has never been out of Buganda, though she has been to the district of Kyagwe, where there are similar cases as alluded to above. Child is very drowsy and can hardly be roused; she will, however, answer rationally when roused. Skin coarse, dry and irritating. Pulse 80, good quality. Respiration 18. Temperature normal. Tongue moist with a thin fur. Not particularly anæmic. Conjunctiva normal. No respiratory symptoms. Filaria perstans found in every specimen of blood examined.

April 27.—Small glands felt in both sides of the Skin covered with white scratch marks. neck. Spleen and liver not enlarged. Heart and lungs quite normal. Urine not examined. Patient freely passes the urine into her bed. Ophthalmoscopic

examination not yet made.

May 9.—Patient still in hospital, and is in same

state as when last note was make.

Case 5.--Mwavu. Boy, aged about 9. Admitted





to the hospital May 4, 1901. Child was taken ill a month ago with gradually increasing drowsiness. No maniacal attack. He has a noticeably large appetite. He comes from Wakoli's, in Busoga, but says there are no other cases of illness like his own near his home, and his friends corroborate the statement. He is seen to be always scratching his skin, which is rough and covered with the white scratch marks. Cervical glands just felt to be enlarged on both sides of the neck, along the sterno-mastoid muscle; submaxillary lymph glands not enlarged. Tongue slightly furred and markedly tremulous. The child is so somnolent that he will fall asleep sitting as one is talking to him, and a sustained examination is impossible. Conjunctiva normal; pupils react both to light and to accommodation, though sluggishly. He lies curled up in bed. Is stated to have suffered recently from a copious dribbling of saliva from his mouth.

Knee-jerks are both markedly brisk, and ankle clonus is easily obtained both sides.

Heart and lungs both normal; liver and spleen not

Urine: specific gravity 1015, pale in colour, but odour normal; markedly alkaline when passed; no albumen nor sugar; deposit of phosphates.

The blood of this patient has been repeatedly examined for *filaria perstans*, but no worm has yet been detected in the peripheral circulation.

Case 6.—Byaketa. Man, aged about 45. Admitted to the hospital May 9, 1901. Patient comes from Bu'si, but states that he contracted the disease in Nandi country (about lat. 0, long. 35 E.), whither he went amongst a number of porters two years ago. No one else in his caravan contracted the disease. Onset of the illness was gradual. He states that he first fell ill of fever and then noticed that his walk was unsteady, and after that an unconquerable lethargy and drowsiness overcame him. Patient does not seem to be particularly drowsy, and responds to questions without hesitation, though slowly, and occasionally yawning. He seems intelligent and so little has the aspect of sleeping sickness that when his blood was examined it was a surprise to find the filaria perstans in the first specimen of blood examined. However, his skin was conspicuously rough and coarse, and covered with scratch marks. Cervical glands distinctly enlarged. Tongue furred and moist. He staggers in his walk. There is no salivary flow, though patient states he occasionally suffers from this symptom. There is no history of mania or vertigo. Pulse regular in force and rhythm; excellent quality. Appetite not abnormal.

Case 7.—Mufumbiro. Woman, aged about 50 years. Comes from Ngogwe, Kyagwe, but contracted her illness in Busoga. Admitted to hospital on March 14, 1901. Her neighbours noticed that she was very apathetic, and told her that she was suffering from sleeping sickness. She does not appear to be very drowsy. Repeated examinations of the blood have failed to show the presence of the filaria in the peripheral circulation. Under treatment she became brighter and less apathetic. The skin is harsh and irritable and patient is always scratching herself.

April 11.—Patient is fat and well-nourished. No

jaundice. Tongue clean. Rather anæmic. and lungs normal. Liver and spleen not enlarged. No ascites. The attendant doubts the drowsiness. Habits unclean; passes water into bed.

CASE 8.—Name not known. Patient was only seen on an itineration when any detailed examination was impossible; but the following points were noted: Illness stated to date from three months ago. Contracted in the Nandi country east of Busoga. Onset very gradual, and stated to be merely increasing lethargy and drowsiness. Patient could then be roused with difficulty. Speech was slow, hesitating, and indistinct. Patient anæmic. Pupils small and react sluggishly to light and accommodation. Gait staggering, and patient would have fallen but for help. Skin was harsh and covered with scratch marks.

No examination of blood was possible, neither was any note taken as to condition of cervical glands. The general aspect of patient was undoubtedly that of sleeping sickness. Attempts to trace the further history of this patient proved unsuccessful. Patient was

a middle-aged man.

Reviewing the above series, we see that two were girls, two were young men, one a boy, two middleaged men, and one an elderly woman. Of the seven cases where a blood examination was obtained filaria was easily demonstrated in five, while in two it could not be found after a fairly thorough, though, doubtless, not exhaustive search; yet the fact remains that it is easier to find the worm in some cases than in others, and in the same case the facility of finding the worm in the peripheral circulation seems to vary from time to time. Again, I think it is noteworthy that we have never heard of any wide-spread epidemic of the disease in this part of Africa, and our patients have generally denied the existence of other cases in their neighbourhood. Of our series, two contracted the disease indubitably in Busoga, two on a journey that led through Busoga to Nandi, whilst four have never been out of Buganda. A maniacal onset occurred only in one case. With regard to treatment we have tried arsenic, tonics, and quinine, but without the slightest apparent benefit. The course of the disease in the two fatal cases was three and two and a half months respectively, but Case 2, Nasanieri Seputimba, who cannot be far from his end now, has lasted three years. So far we have been quite unable to arrive at any definite conclusion as to the cause, unless as Manson suggests it is the filaria perstans which has been found in so large a proportion of the cases examined in localities so widely differing climatologically and geographically as Uganda and the West Coast of Africa. Again, one finds it hard to see why one form of filaria should produce so pecular a condition as elephantiasis and another species so widely different a condition as sleeping-sickness. That we shall soon have more abundant material to study seems unfortunately more than a mere probability.

#### A CASE OF MULTIPLE ABSCESSES OF THE LIVER.

By W. E. DE KORTE, M.B.Lond.

Midland Hospital, Graaff Reinet, Cape Colony.

J. L., a Polish Jew, aged 35, came to the hospital with a history of dyspepsia of four years' duration. He had been losing condition lately, was unable to take his food, and slept badly. He complained of a band of fulness extending somewhat to the right at the pit of the stomach. He had had dysentery four years previously, from which time he dates the commencement of his illness. He had also suffered from malaria in Mashonaland prior to this, and was treated during his illness for fever and for syphilis; this information was imparted by his doctor. As evidence of syphilis, he had several dark pigmented spots on his right shinbone.

On admission, there was slight fulness of the right hypochondriac region, temperature 101 degrees F. After a week's observation, the swelling in the hypochondriac region becoming more marked, an aspirating needle was run into the tumour and some dark chocolate-coloured fluid withdrawn. Placed under the microscope, this fluid was seen to contain pus cells, many micro-organisms, and a number of amœbæ coli; that the bacteria of pus were also present would at least seem highly probable. was decided to operate by two stages, after the method adopted by Mr. Godlee. The patient having been placed under chloroform, a vertical incision, three inches long, was made midway between the two borders of the right rectus muscle, about one and a half inches below the margin of the ribs and the liver exposed. The surface of the liver was quite smooth, and as far as could be felt there were no adhesions. In the act of placing the outer circle of interrupted sutures, the needle, a small fullycurved Hagedorn, practically opened the abscess. The liver substance now bulged out of the wound to an extent of fully two inches beyond the level of the abdomen. Here was a dilemma. If an attempt had been made to place sponges so as to prevent the escape of fluid into the peritoneal cavity. the liver would have been forced away from the wound. A considerable quantity of pus, &c., would inevitably have reached the peritoneal cavity before a sufficient number of sponges could have been so placed as to effectually prevent this contingency. The wound in the liver was enlarged and the parietes pressed against the protruding liver. The pus now fairly squirted out, and though no measurement of the quantity was taken, at least four pints must have escaped. A large drainage tube was inserted into the abscess cavity and the wound dressed. The patient recovered well from the operation and was not sick. Some dark blood oozed from the wound in the afternoon, and the dressing was deeply bilestained on the following morning.

Two days later the discharge was more purulent. The patient slept well, but complained of pain along the lower dorsal spine. For eight days in all, his temperature remained normal night and morning. The wound looked healthy. Patient took his food

well, but his pulse was quick and soft; rate, 120 per minute.

Fifteen days after the operation, discharge thick and fully purulent, and very variable in quantity. Pulse 140. Temperature 101 4 degrees in the evening. Right hypochondriac region is scaphoid and looks like the left side. Patient now began to lose ground. Hectic fever supervened and it became evident that either the wound did not drain, that the necrotic process was extending in the liver, or what seemed more probable, that there was another abscess.

Twenty-three days after the first operation the patient was placed under A.C.E.; a probe passed along the drainage tract, and a counter-opening made in the line of the posterior axillary fold. The wound was flushed twice daily with a hot creolin solution. For a few days the discharge was bilestained and turned the iodoform gauze black. Hectic fever continued.

Five days later the abdomen suddenly became tense, hiccough, flatulence, and sour eructations troubled the patient. The hepatic dulness, which began immediately below the right nipple, had now migrated to the seventh intercostal space, there was some dulness at the base of the right lung behind and a short cough worried the patient. There have been no rigors. The patient gradually became weaker and died a month after the performance of

the first operation.

Post mortem.—Liver considerably enlarged. Peritoneum adherent about operation wound, no other adhesions of the convexity. Occupying the posterior surface of right lobe was a large abscess, which had opened into the peritoneal cavity, but was confined by some adhesions and the colon below. This abscess communicated with the original one at its lower and posterior part. All that was left of the original abscess was represented by the drainage tract. The other portions of the liver were riddled with abscesses ranging in size from a walnut to that of a large orange. The matter in these abscesses was a lemon colour and of the consistency of laudable pus; that found in the original abscess of a dark chocolate colour and of a watery consistence. The diminution of the hepatic dulness in front and its persistence behind for some while after the first abscess had shrunken, was due to the rupture and subsidence of the posterior abscess into its new abode in the peritoneal cavity. The patient was known to have contracted syphilis, but what part this disease played in modifying the evolution of the case is difficult to say. For although it is possible that some of the smaller abscesses were breaking down gummata, the majority were too large to admit of this explanation. At the time of operating no irregularities were felt on the surface of the liver, yet at the post mortem some of these abscesses caused projections close to the operation wound; this would indicate that these abscesses formed subsequently to the operation, and indeed it would be hard to imagine that the patient could have lived long after the formation of these secondary (?) abscesses; so numerous were they.

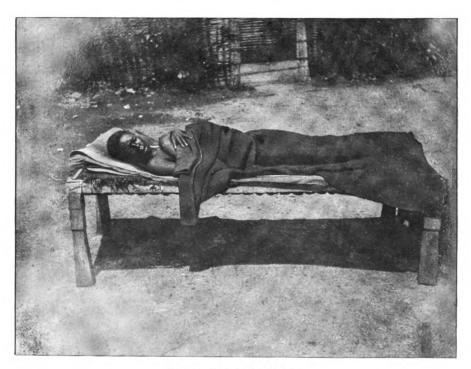
The following seem to be some points of interest

in this case: -



SLEEPING SICKNESS.

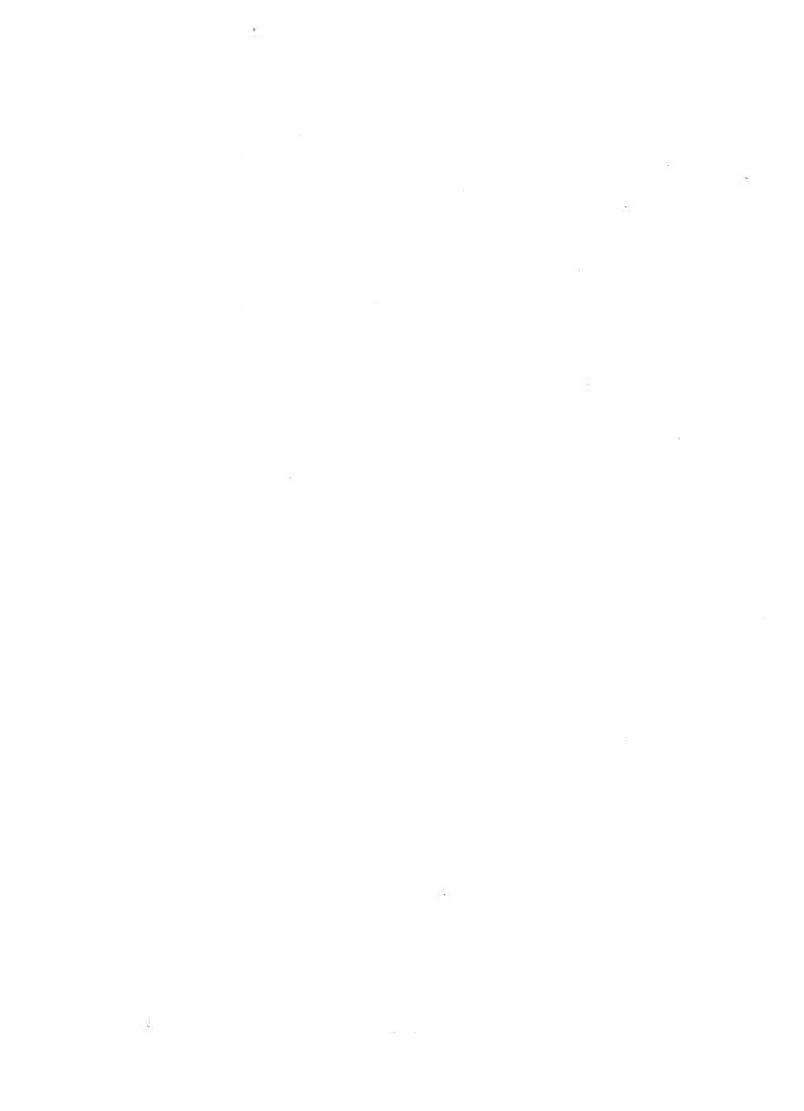
Photograph, illustrating Case 2, described in Dr. J. Howard Cook's article on "Sleeping Sickness in Uganda."



SLEEPING SICKNESS.

Photograph, illustrating Case 3, described in Dr. J. Howard Cook's article on "Sleeping Sickness in Uganda." Photograph taken two days before death.

Bale and Danielsson, Ltd. London.



(1) The long period of four years that the patient had symptoms, which were considered to be chiefly dyspeptic.

(2) Attacks of pyrexia during this period which were diagnosed as eruptions of malarial fever.

(3) The absence of sweating and rigors.

(4) The considerable time that elapsed between the attack of dysentery—four years—and the time when an abscess undoubtedly existed.

(5) The very rapid development of the abscess towards the end. It became distinctly visible, bulging out the right hypochondriac region in about

seven days.

(6) The impossibility, that is when the capsule is not thickened, of sewing the visceral peritoneum to the wound, and the danger of trying to include the liver substance in the suture, when an abscess is superficial.

(7) The fact that though unavoidably no precautions were taken to prevent the contents of the abscess from reaching the peritoneal cavity, no in-

fection occurred.

This piece of good fortune may be explained in one of two ways. Firstly, that the abscess contents were sterile-from the microscopical examination of the pus aspirated this would seem very unlikely. Secondly, that the parietal peritoneum acted as a valve-like collar and firmly closed on the protruded liver substance. The factors favouring this action would be the tension in the abscess, causing it to bulge into the abdominal wound; this protrusion would be greatly assisted by the elastic pressure of the thoracic and abdominal viscera, and the more the tension in the abscess fell, owing to the escape of its contents, the more effectually the elastic pressure of the abdominal viscera would thrust the liver into the abdominal wound, this being the only spot where escape is possible and at which there is no reaction.

Now the edges of the abdominal wound and underlying peritoneum being comparatively rigid, the soft liver substance would be moulded into the wound and forced taut against its under surface, somewhat after the manner that a rent in the outer covering of a pneumatic tyre would nip the inflated inner tube protruding through a rent in its wall.

(8) There was no evidence of syphilitic peri-

hepatitis or cirrhosis.

(9) It would be of great interest to know the relation of the multiple abscesses to the original one. From the colour of the pus, &c., it would seem probable that these abscesses were of comparatively recent formation. Did they form subsequently to the performance of the first operation? Were they secondary to the first abscess and derived by metastasis, or did the foci of infection lie dormant, being kept, as it were, in abeyance by the activity of the first abscess, and the altered circulation in the liver, which the presence of so large a tumour as the first abscess in its substance, was bound to have induced? The absence of rigors would suggest that these abscesses were not metastatic or pyæmic.

(10) If the opening of an hepatic abscess is done in two stages, it would be wiser for a beginner not to attempt Mr. Godlee's method of stitching, but

merely to place some gauze in the wound, and to rely upon this along with firm pressure to affect adhesions.

# BATH AS A HEALTH RESORT FOR TROPICAL PATIENTS.

By Charles Begg, M.B., C.M.Edin.

BATH, justly celebrated as possessing the only truly thermal spring in Britain, has been further favoured by nature in its climate, its sheltered position, and its beautiful surrounding scenery. One writer, Dr. Spender, says of it: "A rival the city can never have in its situation, beauty, salubrity, and shelter—to say nothing of its many social privileges." It is thus an ideal refuge for those who have broken down in the tropics and are forced to return home to re-establish their health.

Bath lies in a bend of the valley of the Avon, has sloping ground with every possible aspect, but is only exposed to the west; the slopes facing the south and south-west being most built on. The elevation varies from 60 feet on the river bank to about 550 on either side, mean elevation being 285 above sea-level; while Lansdown, outside the northern boundary, rises to 750 feet. The ground being sloping, the nature of the subsoil is not of such vital importance, but few residential areas can offer such a variety of subsoils as are to be found in Bath. The corrected death-rate for the year 1900 was 15.24 per 1,000. The water supply is exceptionally good and is obtained from numerous springs. The water is hard and free from organised or unorganised impurities. The hard character of the water suggests its value in cases of chronic diarrhœa.

Relative humidity.—Bath has been said to be exceptionally moist, but statistics prove that of sixteen towns, only two are 1 per cent. less; London and Llandudno being 76, Bath 77. All the others are higher; Torquay and Lowestoft head-

ing the list with 87 during 1900.

In dealing with the questions of atmospheric pressure, sunshine, and wind force, an excellent case can be made out for Bath in comparison to other places. The hours of bright sunshine in 1900 were 1503·2. The mean temperature for the year was 50·4 degrees; for October, 50·8 degrees; November, 46·4 degrees; December, 46 degrees. February was the coldest month with 33·8 degrees; February 23 was the coldest day, when the absolute minimum was 16·8 degrees, and July 19 the hottest, at 89 degrees. The Rev. Leonard Blomefield gives the following table taken during a period of eleven years:—

		Mean.	Highest.	Lowest.	Range.
Spring	 	48.4	 51.2	 45 8	 5.4
Summer	 	60.3	 63 5	 58.1	 5.4
Autumn	 	50.7	 52.3	 48.5	 3.8
Winter	 	41.4	 46.3	 36.4	 9.9

Rain fell during 169 days, but only during nine weeks of the year did a rainfall of over 1 inch occur. Total for year, 30 · 79 inches; mean fall for thirty-five years, 31 inches.

Quality of the air .- In extreme summer weather

Blomefield says: "There may exist a difference as to the quality of the air in Bath and in the surrounding hills, but Bath is not a manufacturing city, therefore the ozone present is not destroyed by smoke and other impurities; but the cooler breezes of the downs on the north and south sides of the city abound in ozone." He also adds that the statement circulated a century ago by Heberen that Bath is relaxing is now recognised as traditional and not existing in fact.

I am indebted to the report of Dr. Symons, Medical Officer of Health, for many of the above facts, a consideration of which cannot fail to impress us with Bath's desirability for our purpose. Residences can be fixed at any desired level, and patients can either be protected from the wind while exposed to the sunlight by residing in the sheltered lower levels, or, still, obtaining the advantages of all the sunlight going, can reside on the slopes at any desired altitude quite protected from the harsher winds. A great deal has been written in favour of bracing and stimulating health resorts, but experience shows that much of it will have to be rewritten. It is a great question how far it is wise to send a patient who is below par to a place which tempts him to spend quickly the small balance of reserve force left to him. The question is intimately related to the use of medicinal or other stimulants at the bedside. It too often proves his undoing and proves to be the last straw. A time arrives when such places have their decided use, but of far greater value in the majority of cases are those places where the dormant energy of the patient is not unduly stimulated, where, encouraged by largely natural surroundings, bathed in sunshine, protected from the colder winds, he can build up the reserve force instead of spending it. Most of our tropical patients come under this class, and need all the shelter and sunlight they can get. They have become specially susceptible to cold, and are unable to stand exposure to our east wind. This practical aspect of the question has been discovered by the public for themselves, and a large number of the residents of Bath are men retired from the East. Before death claims them the average age is so well past the traditional alloted "three-scoreyears-and-ten" as to be most noticeable. On account of Bath's sheltered position it has acquired the reputation of being relaring. I think if we substitute the word sedative we will better understand what is meant-sedative or soothing, instead of stimulating and exciting. I find that insomnia quickly yields to its influence, and it is the regular observation of patients to find that "sleeping drugs" are no longer necessary after arrival, while the purity of the air is also so marked that it is as common an observation by persons suffering from chronic headaches to find a remarkable freedom from them. If such are some of the results of "relaxing," I consider them highly desirable and of the greatest value in the treatment of diseases.

We have spoken of the hard character of the drinking water and its value in the treatment of diarrhœa, but in the use of the mineral water of the Spa we have also a powerful agent for the same purpose. Small quantities taken at a reduced tem-

perature are a powerful constipating agent. It has also been demonstrated to be capable of rapidly benefiting cases saturated with the poison of malaria, evidenced by either its anæmia or even febrile condition. For this purpose the excellent installation of the Berthollet, or natural vapour bath, is used. The waters contain both arsenic and iron in minute but apparently sufficient quantities, and also gases such as carbonic, nitrogen, oxygen, and the recently discovered argon and helium. It has yet to be worked out which of the ingredients does the good and how it acts, but the gratifying remains that Bath waters cure the malarial cachexia in a manner that has acquired for them a special reputation. At Bath the douche massage is also available under exceptionally favourable circumstances. Bath is the only spring in Britain where the water issues from the earth at more than the temperature required for the proper carrying out of the process. The spring is also of the class, the indifferent thermal, which has been found to be the most suitable. At all other springs in Britain, Buxton, Harrogate, &c., &c., the water has to be boiled before it can be used, and it is idle to say that the resulting water is the same. When the temperature is raised gases are driven off, and at different temperatures the saline constituents vary. most important of all is the value of telluric heat. Water heated by nature is heated all through and retains heat for long periods; water heated by artificial means is a poor substitute.

In another journal\* I have pointed out the great

value of the douche massage as an agent in bringing about a healthy condition of the body by promoting metabolism, and eliminating blood poisons of all sorts from the system. It therefore will prove a valuable help to us in dealing with many of our

tropical patients.

To sum up. A sheltered spot with more than its share of the sunshine granted to England, a possibility of picking a desired altitude at which to reside, a country of great beauty, full advantage of which can be taken in walks and drives if the patient's state of health does not limit him to our various parks; and added to all this, a Spa, whose waters are equal to the best, and in many ways specially adapted for our purposes, render Bath a particularly desirable place for tropical patients.

VARIATIONS IN THE FIGURED ELEMENTS OF THE BLOOD IN MALARIA.—A. Dionisi, in the Il Policlinico, May, 1901, states that in æstivo-autumnal fever, during the febrile stage and for some hours afterwards, the red corpuscles vary in number in the amount of hæmoglobin they contain. In simple tertian and quartan fever the variation is slight. In the cutaneous blood vessels and in the veins the alteration is due partly to the concentration of the blood in them and to their varying calibre, but partly also to the disturbances which characterise the capillary circulation in internal organs.

<sup>\*</sup> The Scottish Medical and Surgical Journal, January, 1901.

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THE

## Journal of Tropical Medicine

JULY 15, 1901.

The issue of the Journal due on August 1 will be delayed until August 5, so that at least part of the work of the Section of Tropical Diseases may be recorded in that issue. The first day the Section meets is on July 31, and on the two succeeding days, August 1 and 2, the meetings continue. We hope to be able to give a résumé of the papers and discussions during the first two days of the meeting in the early August number.

THE OFFICIAL RESTRAINT PLACED UPON MEDICAL COMMUNICATIONS FROM OFFICERS IN THE PUBLIC SERVICES.

THE papers which appear from time to time in the *Indian Medical Gazette* are creditable alike to the medical officers who communicate these papers, and to the military authorities of the Indian Service who encourage their officers

to contribute their valuable and unique experiences. We wish such freedom belonged to all branches of our naval and military services. There has been in the past, and there evidently still exists at present, a belief that (except perhaps in the Indian Medical Service) it behoves a junior officer to forward his observations through his senior, or even through the office of the Director-General of his department. The excellence of the Indian Medical Service is no doubt fostered and maintained by the liberty afforded them to contribute papers direct to the editors of medical journals.

The fact that papers have to be submitted to a senior officer before being published is apt to stifle individuality, and to check professional zeal. These steps are supposed to be necessary for the sake of discipline, but there is a form of discipline which is not calculated to improve but to lower. A well-regulated discipline is an elevating power, be it applied to habits of mind or body; but when ill regulated it does harm to the governed as well as to the governor; it fetters the inclinations of those subjected to it, it hangs over their freedom of action and thought, impeding them at every turn, until, in fact, the character and mind are enslaved by the ever present incubus.

The country complains that the medical men in the public services are of an inferior stamp; with this we do not agree. The young medical men who enter the navy and army are not the "sweepings of the schools." In days not so long gone by, some of the best men from our medical schools entered these services, and at the present day the fault is not with the quality of the men, as is generally stated, the fault lies within the services themselves. Under the name and shelter of that frequently misapplied term discipline many injustices are perpetrated and many young spirits broken. There is a discipline in life apart from buttoned-up coats and shoulder straps, and one which effects its purpose as thoroughly and certainly; it is effected without threats of arrest or of punishment, and gains its ends by guiding and directing thoughts and actions into the right channel. This is done by the usual amenities of life and engrained by daily experience, but the discipline is wholesome and elevating when used aright; not so a discipline of an adventitious character. Than the army or navy, no school of discipline may be better, but it is at times misapplied, misunderstood and misdirected, causing irreparable mischief when the hour of trial comes or when the best interests of the service are at stake.

Greater professional freedom therefore, should be allowed in the public services; freedom to work, to write, and to speak on professional subjects. The necessity to send papers for publication through a senior officer or the Director-General's office, should be removed. Such a step will not be subservient to discipline, but will engender a more thorough discipline than is to be attained in the narrow field of official supervision. The world will be the judge of the communication, and prove, perhaps, a more stern or just judge than the officer to whom may only belong the qualification of "senior."

Discipline should not imply slavery, but a training whereby freedom may safely be given. In this sense therefore, it would be well to remove an autocractic regime which goes far to enslave the medical practitioner in the public services; and that complete professional freedom should be allowed so long as the public interests are not in any way interfered with. In regard to medical information there should be no official secrets; nor should it lie with any other than the medical profession to decide what should be published or what withheld from medical literature. Admiralty and the War Office are to blame in the matter, not the medical departments of either. The heads of both these departments have for many years done their best to let the experiences gained in the naval and military medical services be known to science; but they are hampered in many ways: by expenses, by the bug-bear of wrongly named discipline, &c. It behoves the whole medical profession to stir itself in this matter, and to insist that there shall be no restraint from writing and speaking on professional matters placed upon our medical brethren in the public services in the name of "discipline."

#### NON-VENEREAL BUBOES.

### PESTIS MINOR?

The evidence in connection with this ailment is gradually accumulating. From the coast of China cases have been reported by Surgeon Godding, R.N., Cantlie and Begg; by several medical men in the Straits Settlements; in Calcutta by Professor W. R. Simpson; from the Volga in 1878-79 by Payne, &c. Now we hear of the disease from the United States of America in an article entitled "Inguinal Bubo as a Complication of Malarial Fever," by A. C. Smith, M.D., Assistant Surgeon in the Marine Hospital Service, U.S.A., in the New York Medical Journal, June 22, 1901.

Dr. Smith states: "My attention has been attracted a number of times within the past dozen years to a group of symptoms which I have never seen described in any text-book on medicine or in current medical literature, and which may be of special interest and importance to report at the present time. The group consists of inguinal bubo associated with malarial fever, the bubo being most commonly non-suppurating and the fever of the æstivo-autumnal type, though not invariably so. The bubo, in the cases which I am about to report, occurred without suspicion of venereal infection and was clearly secondary to the fever and dependent upon it.

"The cases are presented solely as a clinical study. I regret that no blood examinations can be given with them. All were observed before the day of universal blood examinations in malarial fevers had arrived. The course of the fever and the mode of recovery in each are sufficiently distinctive, however, to place the diagnosis beyond probable dispute."

Six cases are fully reported upon and the temperature charts are also communicated.

CASE 1, a coloured man, had suffered from necrosis of toes from frost bite. Some time afterwards, with a severe rigor, a bubo developed in one groin. Quinine was administered, and after profuse sweating the fever disappeared within twenty-four hours, and the bubo subsided.

Case 2, a Dane. A suppurating bubo in right

groin with no local cause. Bubo opened.

CASE 3, a Nova Scotian. Glands in both groins indurated; feverish. Quinine given thrice daily in 10-grain doses, increased after four days to 40 grains daily. Fever and bubo subsided together.

Case 4, Norwegian. Bubo right groin; feverish. Under quinine fever subsided, and subsequently bubo disappeared without suppuration.

Case 5, Norwegian. Bubo in left groin ascribed to a blow. Patient believed to have malarial fever. Quinine did not affect fever, but with rest, poulticing, and tonics the bubo disappeared without suppurating.

Case 6, Dane. Non-venereal bubo in one groin; had been treated some months previously for malaria. Quinine reduced temperature; bubo softened superficially and was opened, but no pus escaped. The patient recovered without suppuration in wound.

Dr. Smith observes: "Besides the foregoing, I observed others at Galveston, of which I have no notes, and one or two at Memphis, Tenn. I have lately seen a case at New York, in the person of a sailor running between this port and Havana, but, unfortunately, only one examination of his blood was made before quinine was administered, and as that examination was not entirely satisfactory I omit reporting the case in detail. Free pigment granules were seen, but the plasmodium itself was not captured in that single search. I hope the attention of other observers will be attracted and that cases will be reported in which a thorough examination of the blood has been made. Such reports are most likely to come from tropical or subtropical regions.

"In Public Health Reports for May 3, 1901, a report by Assistant Surgeon Stansfield, U.S. Marine Hospital Service, from Cebu, Philippine Islands, mentions the existence in that island of a large number of cases of mild fever, rarely fatal, accompanied by glandular enlargement. It will be interesting to know what these cases prove to be

on investigation."

This peculiar affection is gradually coming to the notice of the profession, and will at no distant date

be an important question.

Dr. Smith's cases, in five instances out of six, subsided without suppuration; of Cantlie's cases in Hong Kong, only one bubo out of forty-three cases noted recovered without suppuration; of Begg's seventeen cases in Hankow, all required to be operated on.

The question of malarial complication raised by Dr. Smith is perhaps problematical; and the temperature charts are not characteristic of malarial

fever

The nomenclature of the ailment is unsettled. Non-venereal bubo, climatic bubo, bubo d'emblee, &c., have been employed to designate the disease; but the names convey little information concerning the complaint. Pestis minor is perhaps the best term, as it conveys an idea of the course of the illness; but the word "pestis" leads to scare, and many believe "pestis minor" to be a mild form of true plague, a belief which is wholly unjustifiable.

In London, during 1900-1901, a number of cases of non-venereal buboes have been noted, and as these were exceptional cases in practice, the doctors, under whose notice such cases occurred, not infrequently reported them as suspicious cases of plague. At first styled "pestis minor," they are now returned as "non-venereal buboes," owing to the alarm the name "pestis" created. Although in no sense part and parcel of true plague, the disease should be known scientifically as pestis minor, as it is observed only before, during, or subsequent to, an outbreak of plague, and is perhaps as sure a sign of the presence or adjacency of true plague as are dead or infected rats.

## Correspondence.

To the Editor of the JOURNAL OF TROPICAL MEDICINE.

Gentlemen,—In Dr. Albert Cook's interesting list of diseases met with during his work in Uganda, recently published in the Journal, he says that the "jigger" flea first appeared on the Coast in 1899. As he says, however, elsewhere in his article that he himself met with this pest at Machakos in 1897, it would appear that it took somewhere about two years for the "jigger" to travel less than 300 miles, and that, too, along the great caravan road to Uganda. This would appear to be rather a long time, considering the number of caravans walking up and down this road.

As a matter of fact, if my memory serves me right, I remember hearing in March or April, 1898, of the appearance of the "jigger" among the inhabitants of Mombasa for the first time, just at the time when I was leaving the Coast for up country. The first cases occurred, I believe, among some of the Indian police employed in connection with the Customs Department, and I was not able to ascertain how they acquired the pest. Probably one man got infected from one of the native porters walking about the Customs Yard, who had brought it down from up country. All the first cases occurred in one banach and the jiggers were obviously caught from each other.

Yours faithfully,
ARTHUR T. WHITE.
P.M.O., The Nile Reservoir Works.
Late M.O. Uganda Protect. Staff.

The Nile Reservoir Works Hospital. June 27, 1901.

## Current Miterature.

#### LEPROSY.

In a report recently made to the Paris Academy of Medicine, Dr. Besnier stated that leprosy was increasing in France. At the Hospital St. Louis in Paris fourteen cases are being treated. In Savoy and Brittany there are several endemic centres. Dr. Besnier recommended that stringent measures be at once taken to suppress the disease.

#### MALARIA.

Dysarthria and Myasthenia due to Malaria.—In the *Il Policlinico* for May, 1901, L. Panichi describes two cases of dysarthria. In the case of one man, the letters r, s, z, and y were pronounced with difficulty, and he spoke slowly, pausing between words and even between syllables of words. In the second case the patient found n. r. and s especially difficult to enunciate.

Myasthenia was observed in one case. The limbs, muscles, active movements were very slow, the fingers were very tremulous in a certain position, and the left foot was occasionally seized with a rhythmical shaking. The patient could not maintain the erect position.

Malarial parasites were found in the blood of the three patients, and quinine cured in every instance.

INTERMITTENT NERVOUS AILMENTS ASCRIBED TO MALARIA.—In the Revue de Médicine, May 10, 1901,

M. Busquet reports a case of intermittent paralysis of both anal and vesical sphincters and of the right leg appearing during febrile attacks due to malaria. The paralysis disappeared during the afebrile periods. Malarial parasites were found in the blood and the symptoms disappeared under the influence of quinine.

#### YELLOW FEVER.

THE SPREAD OF YELLOW FEVER IN HOUSES.—In an article in the Medical Record for June 15, 1901, Dr. H. R. Carter alludes to the infective power of the house, and sums up his beliefs as follows:-

(1) Cases of yellow fever which occur aboard ship after disinfection at maritime quarantine stations have not been followed by any others among the crew.

Eleven vessels disinfected from "at once" to five

days after the first case. (2) Cases of yellow fever which occur in houses

disinfected soon after occurrence were not followed by other cases among the inmates.

Five houses-twenty-four susceptible inmatesdisinfected, one seven days, one two days, and the rest probably four to ten days after first case.

In no case has the contrary been observed.

(3) Cases of yellow fever which occurred in houses vacated soon after have not been followed by other cases among the inmates leaving, although cases occurred among those who remained in the houses or in the neighbourhood.

From seven houses forty-six inmates were removed from two to eight days after development of the first case. In no case has the contrary been

observed.

With these consider the forty-nine people moved from houses in which yellow fever had occurred to the Jacksonville "Observation Camp," none of

whom developed yellow fever.

(4) Cases of yellow fever which occur in clean houses are not followed by other cases among the inmates exposed to no other infection until after such time as shows that the disease was not contracted for a number of days after the development of the first case, although these same inmates do develop yellow fever from these same houses later.

#### Letters, Communications, &c., have been received from :-

A.—Dr. Albert S. Ashmead (New York).

A.—Dr. Albert S. Ashinead (1997)
B.—Dr. Charles Begg (Bath).
C.—Dr. Chastelleux (Mauritius); Dr. Kerr Cross (Blantyre); Mr. P. Carmody, F.I.C., F.C.S. (Trinidad).
D.—Dr. A. B. Dalgetty (South Sylhet); Dr. C. W.

Daniels (London).

G .- Dr. John Gimlette (Pahang).

K.—Dr. Wm. Kirk (Shanghai); Dr. W. E. de Korte (Graaff Reinet); Dr. Lim Boon Keng (Singapore).

N.—Dr. P. Nightingale (Bangkok). P.—Mr. F. Pearse (Calcutta).

R,—Dr. Ronald Ross (Liverpool).
S.--Dr. Joseph Scott (Shiraz); Dr. Sambon (London).
T.—D. W. Thomson (Turriff).

#### EXCHANGES.

Annali di Medicina Navale.

Archiv für Schiffs u. Tropen Hygiene.

Archives de Medicine Navale.

Archives Russes de Pathologie, de Médec., Clinique et de Bacteriologie.

Australasian Medical Gazette.

Boletin de Medicina Naval.

Boston Medical and Surgical Journal.

Bristol Medico-Chirurgical Journal.

British and Colonial Druggist.

British Journal of Dermatology.

British Medical Journal.

Brooklyn Medical Journal.

Climate.

Clinical Journal.

Clinical Review.

Giornale Medico del R. Exercito.

Hongkong Telegraph.

Il Policlinico.

Indian Engineering.

Indian Medical Gazette.

Indian Medical Record.

Janus.

Journal of Balneology and Climatology.

Journal of Laryngology and Otology.

Journal of the American Medical Association.

La Grèce Médicale.

Lancet.

Liverpool Medico-Chirurgical Journal.

Medical Brief.

Medical Missionary Journal.

Medical Record.

Merck's Archives

New York Medical Journal.

New York Post-Graduate.

Pacific Medical Journal.

Polyclinic.

Public Health.

Revista de Medicina Tropical.

Revista Medica de S. Paulo.

The Hospital.

The Medical and Surgical Review of Reviews.

The Northumberland and Durham Medical Journal.

Treatment.

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#### Motices to Correspondents.

- 1.—All communications will be acknowledged in the JOURNAL under the heading "Letters and Communications Received." Contributors who do not see their names in the list should communicate forthwith with the Editors or Secretary.
  - 2.—Manuscripts sent in cannot be returned.
- 3.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

4.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

- 5.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Editors.
- 6.—Correspondents should look for replies under the heading " Answers to Correspondents.

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## Original Communications.

#### LECTURE ON PLAGUE.

By Professor W. J. SIMPSON. Cape Town, South Africa.

PROFESSOR SIMPSON, at the request of the Cape Town Branch of the British Medical Association, delivered a Lecture on Plague, June 15, 1901, an abstract from which is here appended. After discussing the history of plague, Professor Simpson stated that the causes of lesser mortality of the present pandemic compared with previous pandemics were a lessened virulence of the virus, and the fact that the bubonic type prevailed for the most part in the pandemic through which we were passing in contradistinction to the pneumonic type, which characterised former outbreaks, attended by a higher mortality. Professor Simpson then proceeded to deal with the-

HISTORY OF PLAGUE IN SOUTH AFRICA.

The source of importation of the disease into Cape Town is not very clear, and requires further inquiry. Dr. Gregory, in his able investigation into the case of plague at Middelburg, in the Transvaal, in an Indian in February of 1899, and the history of which he brought before your Society, and which was published in the South African Medical Journal, of August of that year, has shown that there were cases of plague among Indians at Delagoa Bay in December of 1898, and January and February of 1899. There then followed the outbreak at Magude, which, I understand from Dr. Turner, who investigated the outbreak, was limited to some 300 persons. Dr. Kolle attributed its limitation to the absence of rats. On what evidence he bases this conclusion I am unable to say, and I confess I am perplexed, because I see that Dr. Gregory notes that the rats were dying in Delagoa Bay.

No more is heard of plague until March 5, 1900, when the s.s. Kilburn arrived in Table Bay from Rosario, Argentina, with a cargo of forage for the military authorites. From Dr. Gregory's report I learn that there were three undoubted cases of plague on board, and probably a fourth, that of the Captain, who died the day before arrival of the ship. The ship was ordered to Saldanha Bay, the crew were landed at the quarantine station, and the greatest precautions were taken. The Customs house officer in charge of the Quarantine Station was attacked while on duty with pneumonia, and it is, I understand, a moot point whether his disease was plague or not.

The next suspicious cases of plague are heard of near King William's Town in November, 1900. I learn that there is no written report on these cases, but from the newspaper reports of that date I gather that at least four of the cases had bubonic swellings. If this is so, there can be little doubt that some at

least of the cases were plague.

The first undoubted case of plague in the Cape Peninsula was brought to the notice of Dr. Gregory by Dr. Matthew Hewat, of Mowbray, in the person of Mr. MacCullum, a clerk, whose place of work was No. 4 Storage Shed at the South Arm of the Harbour. He was attacked on January 27, 1901, sent to Rondebosch Hospital on February 2, and was removed to Uitvlugt, the newly prepared plague hopsital, on February 9. Dr. Gregory thinks that two deaths which occurred a week before this may fairly be attributed to plague. The first recognised case was quickly followed by two coloured boys from the same shed. The three of them had for more than a week past assisted in trapping rats and then letting them loose for the dog to chase them.

There was also an overpowering smell under the office. This was found to be due to a number of dead rats which the two boys removed with their hands from under the floors and threw into the sea.

RATS DYING OF PLAGUE IN THE CAPE TOWN DOCKS IN SEPTEMBER, 1900.

On inquiry into the sickness among rats, I find it dates back at least to the end of September or

beginning of October. Occasionally rats at that time were noticed by the clerks in the sheds, especially in No. 1 and No. 3, to be ill-looking, to have lost their powers of quick movement, to be more or less covered with sores, to be swollen under their legs, and in moving about to topple over. The boys in the shed sometimes picked them up and threw them into the sea. Sick and dead rats appear to have been noticed more frequently in No. 1 shed. But by December the numbers seen to be ill became more numerous, and by January such was the stench under some of the stacks of preserved meat between the dunnage outside the sheds that it was unpleasant to work at them. It was about the end of January that it was observed the rats began to disappear from all the store sheds and surroundings of the South Arm, and it has only been within the last few days that there is evidence of their returning.

How the rats became infected I am unable to say at this present stage. It is to be noted, however, that the disease amongst them began at the South Arm, devoted entirely to the landing and storage of military supplies, and that from the early part of 1900 and throughout the year, forage was brought in ships to the South Arm from the infected ports of Rosario in Argentina, from Bombay, and from Sydney. Actual cases of plague occurred on one of these ships in March, 1900.

CERTAIN TYPES OF PLAGUE APT TO PASS UN-RECOGNISED AT THE COMMENCEMENT OF AN EPIDEMIC.

The sickness and mortality among the rats prevailed for at least four months before the first recognised case of plague. This is a long time to elapse without any manifestation of the disease in man, and though it is a possibility which may be explained in some other way, I am inclined to think that unrecognised cases of plague, probably of a mild or of a suddenly fatal type, occurred among the natives working at the docks long before the outbreak in February, and that when, apart from the lung-sickness at Izeli, which does not appear to have been plague, we hear of the possibility of plague cases among natives near King William's Town, the source of which was suspected to be the Modder River, it is not at all unlikely that the real source

was the Docks in Cape Town.

The occurrence of mild cases has always been the difficult factor in tracing out first cases of plague. That mild cases of actual glandular swellings have occurred in this country I learnt accidentally from two medical officers who were confronted with such cases last February in troops that were trekking in the north of this colony. For more than a month previous to my inquiry the troops had been quite free, so that I had no opportunity of seeing the cases. The nature of the disease when it occurs in the ambulant form is very apt to be overlooked, because of the mildness of the symptoms. There is usually slight fever, though at times there is none, there is malaise, headache, congested eyes, and a glandular swelling, and if the sickness is in an acute form the duration of the illness is only a few days, while if it is chronic it lasts for six weeks and a couple of months, producing great weakness and prostration.

The fulminating type and the pneumonic type being fatal forms of plague, often without buboes, are also readily mistaken for other diseases, such as gastroenteritis, influenza, and pneumonia of a severe type, when there is no suspicion of plague existing in the locality. Though I think it not at all improbable that cases of the types mentioned occurred before Mr. MacCullum was attacked on January 27, 1901, there could, after all, have been not many cases, especially of a fatal kind, or else they would have attracted attention. The season and condition of the weather may not have been favourable in October, November, December, and January for an extensive manifestation or spread of the disease in the Docks where the rats were dying. It is to be observed that they began to leave the Docks more or less en masse at the end of January, and to migrate into District No. 1, and it is in this district that the first indigenous cases not traceable to the Docks first occurred.

EFFECT OF INOCULATION AND OF EVACUATION OF INFECTED AREAS AS PREVENTIVE MEASURES.

I shall not enter into the general and special measures which have been taken in this epidemic. There are two, however, which ought to be referred to. One is the removal of the natives to a location, the other is inoculation. When plague was found to be spreading rapidly among the natives, it was decided to evacuate the plague-infected areas and remove the natives to a location on the outskirts of the town. The accommodation was provided most expeditiously and under great pressure by the Public Works Department. On the completion of a certain number of huts, an order was issued by Mr. Graham, the Colonial Secretary, for the removal of the natives. In the course of one afternoon a thousand were removed, and in a short time all the natives in Cape Town, except some that were accommodated by the Harbour Board inside the Docks, were removed from the town and placed under sanitary supervision in comfortable huts made of corrugated iron. All except about twelve were inoculated, and with the exception of the first few days of their residence in the location, when cases of plague developed among those who already had the disease in their system, there have only been four cases since March 12 in a community of 7,000 persons, and this notwithstanding the fact that they go into the town to work at the Docks and in some of the most infected centres of the town. In addition to this there is the fact mentioned by Dr. Elliott, of the Harbour Board, that of 1,500 dock labourers inoculated, only one was afterwards attacked with plague. There can be little doubt that if it had been possible for a similar measure on a more extended scale to have been undertaken with regard to some of the most overcrowded, most unsanitary, and most infected quarters inhabited by the Malays, the poorer class of Europeans and coloured population, and then the rats in the locality destroyed, the disease could have been as effectually stamped out.

With regard to inoculation, some misconception has arisen as to its dangers, and as to its inefficiency. Both of these were thoroughly tested in India before the inoculation was introduced as a general preventive, and no general statements will upset what

has been founded on very careful observation and experiment; viz., that the inoculations are perfectly harmless if properly performed, with properly tested vaccine, and if these precautions are taken the immunity secured by the inoculation is an exceedingly high one. Nothing that has occurred in this epidemic has shaken this position. Unfortunately the inoculations do not give immediate protection. It requires six or seven days to secure immunity, but this is the case also with vaccination against smallpox; the immunity not being secured until the eighth day, and we sometimes find a person attacked with smallpox who has been vaccinated a few days before, and the vaccine vesicle and the smallpox eruption on the same patient. I have not been able to obtain information regarding the exact position of matters, for there appears to have been no proper records kept, but so far as they go the inoculations show a highly protective effect.

It appears that fourteen persons out of 16,000 who were inoculated have been attacked with plague, and 637 persons out of 134,000 who have not been inoculated. These calculated give the following

results:

Numbers inoculated ... ... 16,000 Of these the numbers attacked have been 14 Equal 875 per 1,000 of inoculated have been attacked.

The whole popul	ation			 150,000
Deduct inoculat	ed			 16,000
Uninoculated				 134,000
Total attacks			0	 651
Deduct attacks	amongs	t inocu	lated	 14

Equal 4.75 per 1,000 of not inoculated have been attacked.

Attacks amongst not inoculated ...

If the inoculated had been attacked at the same rate as the not inoculated, the numbers would have been 76 instead of 14, which accordingly shows a ratio of reduction about 82 per cent. The incidence on the 16,000 inoculated has been more than five times less than the incidence on the 134,000 not inoculated. In a country such as South Africa, with its native and mixed population, a good portion of which in the towns is living under the gravest insanitary conditions, and which by no manner of means can in a few months be taught to be clean or be brought under a proper sanitary system, I believe that inoculation of the unsanitary classes and of those living in infected areas will be the only practical and effectual safeguard against plague.

REMARKS ON YAWS AND ON THE DISEASES MOST FREQUENTLY MET WITH IN ST. LUCIA.

By St. Geo. Gray, M.B., B.Ch., Colonial Assistant-Surgeon, Castries, St. Lucia, West Indies.

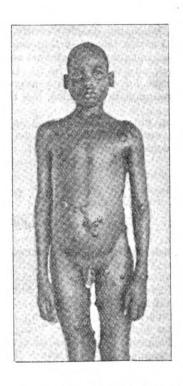
As you have expressed a wish for any notes or photographs of tropical diseases, the enclosed photos of some of my patients at the Yaws Hospital will probably be of interest to you, imperfect as they are.

They are among my first attempts, but I hope to improve, and that the next lot I send you will be nearer perfection.

I think those I send give a better idea of the appearance of the disease than the plate in the September

number of the JOURNAL.

The chief points to be noted are the (1) sessile granulomata, which, under favourable conditions, dry up, leaving maculæ or dark—often black—stains, which ultimately disappear, leaving no trace. I have seen a large granuloma three inches in diameter disappear completely in a comparatively short time leaving no trace whatever. (2) The femoral buboes, which are nearly always, if not invariably, present in every case of yaws that has ceased to be local. A little girl under



my charge is covered from head to foot with a papulosquamous eruption, which I expect to become granulomata in a few weeks. Under certain conditions yaws seems to run a definite course, but I have not yet worked it out fully. It appears to be at first local, there being a few granulomata and squamæ on some part of the body (face, genitals, or feet). These get nearly well, when suddenly a papulo-squamous eruption comes out all over the body, and after a certain time (not yet determined) many of the papules, or "guinea-corn yaws," as they are called, become granulomata. These dry up after a time and the patient is quite well, having no trace of yaws. If, however, as is generally the case, the patient returns, before complete cure, to the old mode of living and to the same insanitary surroundings in which the disease was acquired, a second crop is almost certain to come out, sometimes worse than the original one.

Occasionally, if the disease has not yet become

constitutional, removal to a more sanitary neighbourhood, and a sufficient quantity of good food, fresh air, and sea bathing will be all that is necessary to effect

a complete cure.

I have observed that those granulomata that are exposed to the air dry up much more rapidly than those that are kept moist by perspiration under the clothing, and that those in the axillæ and surrounding the anus are always the last to dry up. These nearly always require some desiccating application such as powdered alum, and are often very intractable.

I have full notes of nearly seventy cases of yaws and hope to publish an analysis of them some day.

#### DISEASES MET WITH IN ST. LUCIA.

I have been interested in the discussion in the Journal as to the prevalence of certain diseases in the tropics. In St. Lucia we have had epidemics of measles and whooping cough recently, and a couple of years ago I saw a few cases that were suspiciously like scarlatina, but they were all very mild. Typhoid fever is practically unknown in St. Lucia. I have not seen a case for over seven years, although it is said to be common in Barbados, less than 100 miles away.

Pneumonia, phthisis and bronchitis are common enough here, and when influenza is on its rounds St.

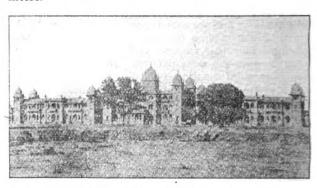
Lucia often comes in for a share of it.

# THE MEMORIAL HOSPITAL, GWALIOR, INDIA.

Description by Frederick Pearse, F.R.C.S.Eng.

The accompanying illustration shows the Memorial Hospital which has been built in memory of the late Maharajah. The present Maharajah is the donor of the hospital ship Gwalior that was sent to China last year. The grounds of the hospital are on the outskirts of the city, and are about sixty acres in extent. The main building lies north and south with an eastern front, and being thus at right angles to the prevailing winds thorough perflation of air is secured. The architecture is of the Indo-The building, about 612 feet in Saracenic style. length, consists of five blocks connected with covered passages. The whole is built on a plinth four feet high, so as to ensure dryness of the hospital floor under all conditions of climate. The centre block, consisting of three stories, contains administrative offices, waiting rooms, and quarters for nurses and house surgeons, in addition to two wards. The two end blocks consist of ground floor only, and comprise dispensary, waiting room, and medical stores. The main side blocks have two stories, and measure from ground floor to first floor twenty feet, and from first floor to roof twenty-one feet; they contain ten wards as follows: Six wards, 57 feet, by 22 feet 6 inches, by 19 feet 9 inches, each taking fourteen beds. The area of each ward being 1,292 square feet, this gives 92 superficial feet per bed. The cubic capacity is 1,822 cubic feet per bed. The other four wards are smaller in size but give more superficial feet per bed. The centre block contains two wards to take ten beds each, giving 184 square feet per bed, and 2,583 cubic feet per bed. The

ground floor wards are laid in mosaic work in marble, but the first and second floors are boarded. All the wards are surrounded with a verandah 12 feet wide. The whole building is fitted with electric light, and there is a hydraulic lift in the central block. Hot and cold water is laid on all over the hospital, and the water tanks admit a supply equal to thirty-six gallons per head per day. The drinking water is filtered by the Mallie-Pasteur filters.



MEMORIAL HOSPITAL, GWALIOR.

The hospital is of course entirely for natives, and in designing it great care was taken to ensure the privacy of female patients, as on this altogether depends the popularity of the hospital amongst the female population. A female patient will be able to come to the hospital, be examined, obtain medicine, and leave the hospital without seeing or being seen by a male patient.

In addition to the main building described, there are six separate blocks built on the plan of cottage hospitals, for the reception of Purdah Nashin women and people of the better class who wish to be attended on by their own people. The photograph I have taken from an illustration in *Indian Engineering*, and I am indebted to the editor for many

of the above particulars.

## THE ETIOLOGY AND TREATMENT OF PRICKLY HEAT.

The interesting papers that have appeared in your valuable Journal, from time to time, on the above subject, and the importance of the subject to so many residents in the tropics whose lives are frequently made miserable by it, must be my excuse for placing on record the results of my thirty-two years' experience and observations, both lay and professional, subjective and objective. Seven years were passed at sea, in different parts of the world, but mostly in the tropics, and the last twenty-five years as Government Medical Officer in the West Indies; the experience of which I submit for the further elucidation of the subject.

In my opinion all the papers I have read in your JOURNAL, valuable as they are in their lines of treatment, travel round the subject. I believe prickly heat to be, as its old name "eczema solare" expresses, a true eczema running from moist vesicles

to dry branny scales, and that the popular idea that it is salutary is a true one, i.e., its presence is protective when established. It is nature expressing "You have been trying to introduce into the system poisons that I have thrown out once, I won't have

them, so I throw them out again."

Both sudoriparous and seborrhaceous secretions are eliminative in purpose, and excrete deleterious products. These, if thrown away, as they are intended to be, and are by those who do not wear clothes, give no further trouble; but held by any garment and kept in application to the skin, are more or less inuncted, and prickly heat is the mode of their rejection. For years I have been free from this trouble, to which for a long time I was subject; and I attribute it to having (in addition to adopting those means recommended, which tend to make a skin healthy), avoided soap and everything that by chemical means hastens the separation of the epidermis, and interferes with its natural secretory power. Veterinary surgeons will tell you, "Do not wash animals with soap if you wish to keep their skins healthy."

I have used cocoanut oil sparingly, as it should be used, for years; but lately have adopted the almond oil and lanoline, 1 to 7, with ol. rosæ, and find it a most delicious and elegant preparation. It is difficult to get cocoanut oil free from taint of burn, even though not rancid, and to take scented oil and maintain its aroma. Then the dusting powder recommended is most valuable as a further aid. When no other has been handy I have used fine Indian corn meal with advantage; but my chief reliance is on thin cotton garments under my Jaegers, and changing my clothes, which I try to do every time I come in, as frequently as three or four times a day. These cotton garments can be washed in a hand-basin with ammonia and water, and dried quickly; while the Jaegers can be worn a week, free from all trace of perspiration or odour of any kind. Under this régime prickly heat quickly disappears.

I have seldom or never seen prickly heat on the lower extremities, below the line of closely applied garments. Intertrigo in all its forms is, I think, of a like nature.

By a Government Medical Officer. West Indies.

QUININE AND BLACKWATER FEVER.—Dr. M. Eder, of Palmira, Colombia, S. America, informs us that the Colombians (Spanish natives) in that locality, take an inordinate quantity of quinine, 20 grs. per diem or more being sometimes administered to young children and proportionately more to adults. Nevertheless blackwater fever is quite unknown there, and this fact is in striking opposition to R. Koch's opinion that blackwater fever is per se quinine poisoning.

STRYCHNIA IN SNAKE-BITE.—The following account of the highly successful treatment of a case of snake-bite by Dr. Babu Atul Chunder Banerjee, Chief Surgeon of the Balijan Tea Garden Hospital, is taken from the *Times of Assam*, in the author's own words:—"A coolie woman, while working in the garden, was bitten by a poisonous snake which

came out suddenly from the neighbouring jungle. Soon after she became insensible, and was brought to the garden hospital, a distance of a mile and a half, being carried by other coolies on a charpai. I found her quite unconscious, and immediately injected 15 minims of liquor strychnia hydrochlor. over the heart. She soon recovered consciousness, and I made incisions at the bite on the leg, and burnt it with strong nitric acid. Finding that the patient was going to collapse, I again repeated the strychnia injection in the muscles of her left arm and followed it with a similar dose by the mouth. The patient began henceforth to steadily progress towards recovery. I did not stop there, but continued administering minim doses of the drug at intervals. In addition I gave her stimulants, and kept her moving to and fro. The woman was all right in the course of four or five hours."

THE ENDEMIC OCCURRENCE OF HÆMOGLOBINURIA OF CATTLE (SO-CALLED TEXAS FEVER) IN GERMANY. Preliminary Report by Dr. Hans Ziemann, Staff-Surgeon on board s.s. Moltke. (Deutsche Med.

Wochenschr., 1901, No. 21.)

Until 1897, this destructive cattle disease was only known in Texas, Roumania, Finland, the Roman Campagna, and Sardinia; in that year, however, the author discovered a new centre in Northern Italy, namely, at Comachio,\* south of Venice, and he has now been able to confirm its endemic occurrence in Germany also. The disease was discovered in the Grand Duchy of Oldenburg, in the district of the so-called New Forest of Neuenburg, where, as throughout the entire district of Oldenburg, it has been endemic for at least 100 years, probably longer, and is locally designated "bloody urine of cattle."

The blood-parasite, called Pirosoma bigeminum, was found by Theobald Smith in America, and is regarded as the cause of Texas fever. The discovery was made in October, 1900, and shortly afterwards the Director of the Zoological Institute in Rovigno, Privatdozent Dr. Schaudinn, obtained information upon the subject. In consequence of his official engagements it was impossible for this gentleman to carry out the local experimental investigations he had planned for this summer. I therefore think it desirable to furnish a brief preliminary statement of the results I obtained, namely: That it may be accepted as absolutely confirmed that the disease, wellknown in Germany to veterinary surgeons as "bloody urine of cattle," which year by year does so much damage, and which in the text-books of veterinary pathology is attributed to the eating of poisonous plants, is very nearly related to the parasitical disease, Texas fever. Reports as to the experimental transmissions of the disease, its further geographical distribution in Germany, as, for instance, in the Black Forest, Upper Bavaria, Westphalia, East Holstein, &c., must be withheld for the next report.

The confirmation of the fact that the bloody urine of cattle in Germany is also caused by blood parasites, which, as in Texas, may be transmitted by ticks, is a matter that may be regarded as one of

considerable importance.

<sup>\*</sup> Ziemann, Ueber Malaria und andere Blutparasiten. Jena, G. Fischer.

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THE

## Journal of Tropical Medicine

August 1, 1901.

## THE INVALID ON BOARD SHIP. ADVISA-BILITY OF CARRYING A TRAINED NURSE ON PASSENGER STEAMERS.

THE lot of an invalid on board ship, whether old or young, male or female, a passenger or a member of the crew, is at all times an uncomfortable one. But more than discomfort may obtain; positive danger to life is apt to occur, even on ships in which a medical officer is carried, from lack of skilled nursing.

Leaving the British ports many "trip" steamers proceed yearly on "pleasure" voyages to different foreign countries; the Mediterranean being one of the most popular routes. In one of these steamers with every cabin and berth occupied a few cases of serious illness test the accommodation to the utmost, and throw the organisation of the steward's department out of gear. A cabin on deck may be given up to the sick, or the captain's cabin may even be placed at their disposal, and so far as actual housing goes, unless the sick are many, the invalid may be comfortable; but beyond this everything is at "sixes and sevens." The difficulty of obtaining food is considerable; the stewards and waiters have their hands full in the saloons, and it is no part of their business, nor even is it often possible for them, to attend upon the invalid except at long intervals. Moreover, preparing food suitable for an invalid proves an extra labour to the cooks; and when the food does appear, it seldom arrives in a palatable fashion.

Should the patient have a high temperature, or be attacked by pneumonia or dysentery, the presence of a nurse is imperative, unless the patient's life is to be jeopardised. The medical officer cannot attend to his special duties and nurse too, and, however willing he may be, he cannot work both night and day as a nurse.

During long voyages, when the invalid is returning from the tropics, it is often a question of careful nursing whether he or she reaches home. Patients suffering from chronic intestinal ailments are in especial danger from want of nursing skill, and the burial at sea of a patient sent home on account of failing health, but too frequently testifies to the strain life on board ship is to an invalid. For the benefit of ailing passengers there can be no doubt as to the expediency of carrying a nurse on passenger steamers; and so necessitous does the practice appear that we hope every liner carrying passengers may soon be compelled to include a nurse as part of the personnel of equipment.

Women are frequently compelled to travel whilst enceinte; and the miseries and dangers experienced by women travelling from the tropics to be confined at home, or of newly married women leaving England for the tropics who are threatened by, or actually suffer from, miscarriage or abortion, when no nurse is on board, are difficult to exaggerate.

The steamship companies will, no doubt, raise objection on the score of expense; but the knowledge that a nurse was on board and available for duty would add to the popularity of any line

of vessels. Objections might also be raised that any line of passenger steamers advertising a nurse amongst the personnel would be apt to get crowded with invalids, and that healthy persons would not care to travel by the same vessels. This is a very short-sighted policy on the part of passengers, for, however healthy, they never know when they may themselves be thankful for the service of a nurse. One way of getting over the difficulty would be, that persons requiring the services of a nurse should pay for their nursing, at rates corresponding to those charged in private nursing establishments.

The discomforts of travelling by sea, under the most favourable conditions, are considerable; but when illness supervenes, the discomforts frequently amount to real danger to life from want of skilled attention. It behoves, therefore, the travelling public to agitate in the matter, and to exercise moral if not legal compulsion to see that lives are not jeopardised on board ship, by either sentimental or financial hesitations and groundless objections, on the part of steamship companies or their servants.

## British Medical Issociation.

## MEETING AT CHELTENHAM.

SECTION OF TROPICAL DISEASES.

On the first day of the meeting this section was well attended. Amongst those present were Dr. Patrick Manson, C.M.G., F.R.S.; Surgeon-General Harvey, C.B.; Mr. P. J. Freyer; Dr. Max Simon, C.M.G.; Dr. F. F. Johns; Professor F. M. Sandwith (Cairo); Dr. Guthrie Rankin; Dr. Andrew Duncan; Dr. G. P. Jordan (Hong Kong); Colonel King, I.M.S.; Dr. Philpotts; Dr. Moffat (Uganda); Dr. Hill (Pakhoi); Dr. Chisholm (Sydney); Captain Battye, I.M.S.; Captain Milne, I.M.S.

Wednesday, July 31.
MR. JAMES CANTLIE, F.R.C.S., Vice-President, in the Chair.

The Chairman remarked that he had to regret the absence of Major Ronald Ross, F.R.S., President of the Section. Major Ross, as was well known, was at the present moment engaged on a scientific expedition sent out by the Liverpool School of Tropical Medicine to the West Coast of Africa, to demonstrate the most ready method of destroying mosquitoes and their breeding places. One of the

Vice-Presidents, Mr. Johnson Smith, F.R.C.S., was also unavoidably absent.

MR. CANTLIE read an Address by Ronald Ross, F.R.C.S., F.R.S., Major, I.M.S. (Rtd.), Lecturer in Tropical Medicine, University College, Liverpool, in which he expressed his regret that he was unable to present his Address to the Section in person. The address will be printed in full in our next issue.

#### STONE IN THE TROPICS.

DISCUSSION OPENED BY MR. P. J. FREYER (LONDON).

Mr. Freyer confined his remarks on "Stone" to experiences gained in India. The actual causation of urinary calculi in India, Mr. Freyer remarked, would be perhaps best elucidated by considering the geographical distribution of stone in India. He wished it, however, to be understood he was only dealing with the subjects of oxalate of lime and uric acid calculi, not with the phosphatic variety. The actiology of the last named arose no doubt from disorders affecting the urinary tract; but the formation of the oxalate of lime and uric acid calculi had a different interpretation. Prostatic enlargements were less commonly brought under the notice of the surgeon by the natives of India, not, perhaps, because the condition prevailed to a less extent, but because natives affected by prostatic troubles died without seeking surgical aid.

Distribution.—Urinary calculi were met with amongst persons inhabiting the alluvial plains bordering on the Indus and along the upper reaches of the Ganges. Mr. Freyer believed that the reason for the inhabitants of these regions being attacked was due to the fact that the Indus and Ganges rivers rise amongst mountains of a cretaceous nature, and that the lime-impregnated water was carried down and used as drinking water by those dwelling along their banks. The Punjaub, the North-West Provinces, Sinde, and Gujerat were the chief stone-producing districts, Sinde being perhaps the most highly infected region with urinary calculi in the world. The countries around the upper part of the Ganges only are affected, whereas the districts along the lower part of the Ganges, where the river runs through Eastern Bengal, are well nigh free of the disease.

(\*Timalological.—One reason assigned for the prevalence of calculi in these districts was that the area suffered from extremes of heat and cold. During the extreme heat of summer the urine became concentrated to such an extent that crystalline deposits were apt to result, and that the extreme (comparative) cold of winter caused abeyance of the hepatic functions.

Food as it affects the formation of calculi.—Although many eminent authorities assert that calculous disorders of the urinary tract are due to dietetic irregularities and errors, this can hardly apply in India. Eating rice has been stated to be the cause of stone; but, as it so happens, in the localities in which stone most prevails, wheat, barley, and other cereals are largely consumed. Flesh is eaten by the Mahommedans, but the geographical distribution of stone is not co-extensive therewith;

for in Western and Eastern Bengal there is a marked difference in the prevalence of stone amongst Mahommedans, those in the Western area being severely attacked, whilst those in the Eastern or Lower

Bengal are scarcely affected at all.

Concerning the surgical aspect of stone in the bladder, litholaplaxy is the operation which, to well nigh the exclusion of other methods, commends itself. In 1882, in India, the mortality from lateral lithotomy amounted to 30 per cent. of those operated upon; a figure so high that its recommendation might well seriously be considered. The mortality statistics gathered from the several operations, and published in 1895, were as follows:—Of 147 suprapubic lithotomies, 42·17 per cent. died; of 7,000 perineal lithotomies, 11·45 per cent. died; of 10,079 litholaplaxies, 3·96 per cent. died. The high mortality of the supra-pubic operation and the low death-rate after litholaplaxy speak for themselves.

Surgeons at home are wont to declare that recovery after operation in India is to be expected, and more easy of attainment, owing to the simplicity of the life of the native engendering tissues more easy to heal than in the case of the high-fed European. This is a popular fallacy and has no bearing in the recoveries or mortality statistics. Kidney disease is as wide-spread amongst natives in India as amongst Europeans in Europe; and it is neither scientific or quite fair to fall back upon fallacies of that sort to explain away favourable reports of surgical work in India.

Mr. Freyer bore high testimony to the operation skill and courage of Colonel Keegan, I.M.S., who established litholaplaxy in children as a rational

operation.

Surgeon-General Harvey, C.B., Director-General Army Medical Service, India, endorsed the statements Mr. Freyer had made concerning the success of litholaplaxy in India. The old operation of lithotrity at several sittings had given place to crushing and removal at one sitting. It was a most important point in India when practising amongst the poorer natives, to finish the operation at one sitting, for in former years, when the old operation was in vogue, two of his patients ran away after one or two sittings with the fragments of stone still in their bladder. He had operated on twenty-two cases of stone by lithotrity, of which number three died. To Mr. Freyer and Colonel Keegan, not only India, but surgery throughout the world, was indebted for having established litholaplaxy on a sound basis due to the extensive experience each had gained in India.

Dr. Manson, C.M.G., F.R.S., agreed with the remarks made by Mr. Freyer concerning the practical details of the removal of stone; but he differed from him as to the question of the ætiology of the complaint. Dr. Manson did not believe that the imbibation of water containing lime salts was responsible for the formation of calculi containing uric acid or oxalate of lime; and although, according to Mr. Freyer, it seems that the geographical distribution of stone coincides with the geological presence of calcareous formation in India, the rule certainly does not apply universally. In Great Britain there are calcareous areas where stone is

rare, whilst there are granitic areas—Aberdeenshire for example—where stone is very common. In Canton the rock is granite, and stone is probably quite as prevalent there as it is in Hydrabad, Sinde. There are only two forms of calculi, the atiology of which is positively known to us; one is dependent on foreign bodies introduced into the urinary tract, and the other is caused by the ova of Bilharzia. The formation of the stone in both of these instances depends on the presence of a nucleus. Similarly Dr. Manson believes that in other cases of stone the explanation of their geographical distribution will be found from a study of the nucleus of the calculus. The patchy distribution of the complaint as well as the analogy of Bilharzia suggests a parasitic cause of calculus.

Lt.-Colonel Giles, I.M.S., contended that the water in the stone-producing area referred to by Mr. Freyer was not derived so extensively as supposed by him from calcareous formations, but that the mountains at the sources of the Indus and Ganges were metamorphic rocks with little or no lime; gneiss and schist are the chief conponents of the Himalayas in the regions referred to. It was doubtful also from the analysis of the river and well waters of the north-west of India, whether there was any marked difference between the drinking water

in this and other regions of India.

Dr. Simon, C.M.G. (Singapore) stated that in the Malay Peninsula and in the Straits Settlements urinary calculi were very rarely seen. The cases he had met with during a twenty-five years' residence were few, and all importations. He had never seen a Malay afflicted with stone in the bladder.

Capt. MILNE, I.M.S., stated that in India in many calcareous districts stone was rare, and in other districts in which limestone was absent stone was met

with.

Dr. Leonard Hill (Pakhoi, China) said that in Pakhoi stone was practically unknown, whereas in Canton, some 200 miles off and in the same province, stone in the bladder was very common. In Hangchew urinary calculi were very common, whilst in Ning-Po, close by, practically none were met with.

Dr. Moffat (Uganda), in giving his experiences of Uganda and East Africa in connection with the prevalence of stone, said that in Uganda the complaint was almost unknown, the only case he had seen was a phosphatic calculus in which the salts were deposited around a foreign body. There was

no limestone in Uganda.

Mr. James Cantlie (London) gave an account of the difficulties attending the operation of crushing for stone in tropical countries. The perfection of the instrument had everything to do with the success of litholaplaxy. Mr. Cantlie related a case in which two lithotrites he had with him went out of order and became unworkable just as crushing the stone was started. A reliable lithotrite was of primary importance in every circumstance, but it was, if possible, even more urgently required to be so in out-of-the-way districts of the tropics, where, before a new instrument could be procured many months might intervene. The indiarubber and caoutchouc materials in the tropics were apt to spoil rapidly, and no one who had any practice in litholaplaxy

in the tropics, can fail to remember the anxiety with which he watched the fissures and cracks becoming deeper and deeper in the evacuating apparatus as it was being squeezed during the operation. These were two of the chief objections to litholaplaxy in the more isolated parts of the world, but in large towns where renewal of instruments was possible the operation had everything to recommend it.

Professor F. M. Sandwith, Cairo, stated that the ova of Bilharzia was frequently met with as the nucleus of calculi in Egypt. The question of the presence of lime in the drinking water was one which, if it had anything to do with calculi, was secondary to the establishment of a nucleus. Water supplied from the Nile is loaded with volcanic detritus and becomes charged with lime in its passage through limestone regions. The Egyptian peasants do not filter the drinking water as Europeans do in Egypt. This may be the explanation why the peasant suffers so frequently from vesical calculus.

Mr. Freyer, in reply, said that he had experienced the difficulties met with by Mr. Cantlie, and that it was important to get instruments from only the best makers—there was only one maker in England whose lithotrities could be relied on. (With this statement Mr. Cantlie agreed). The preservation of rubber material in the tropics was a question of frequent use. Were rubber used in the tropics as in temperate climates it would last as long in one place

as the other.

# DUST AS THE VEHICLE FOR THE GERM OF CEREBRO-SPINAL FEVER.

By W. J. BUCHANAN, M.B., D.P.H., Major, I.M.S.

Major Buchanan commenced by referring to his former paper on the incidence of cerebro-spinal fever among prisoners engaged in different kinds of labour in the central prison, Bhagulpur.

In that paper he had described 47 cases of the disease, and he now adds 13 more, making 60 cases

in all.

He is unable to trace the original source of infection in the gaol, but he finds that of the 60 cases 57 came from among prisoners working at "dusty" occupations, while only 3 cases from among prisoners whose occupations, such as weaving, &c., involved exposure to little or no dust, although a minority of the prisoners were engaged in the former occupations.

Dust from occupations is of two kinds—one, that produced in such work as that of brick-field gangs, road workmen, &c.; the other that produced in the work of wheat-grinders, rice-huskers, and the like.

Of the 60 cases, 56 occurred during the dry hot and dry cold months, which are dusty, and only 4 during the wet months, which are of course less dusty so far as dust from roads, &c., is concerned; and all these 4 came from among the grain cleaners, in whose work dust is much the same all the year round.

Long-term prisoners, engaged in spinning, weaving, and other skilled labour, escaped from the disease, and no evidence of direct contagion among the rest could be traced. A work-shed, used for the very dust-producing work of husking rice, was thoroughly

cleaned, disinfected, tarred, and lime-washed, the prisoners working there were moreover given pieces of cloth to wear as respirators, with the result that whereas during the previous year eight cases had come from the shed, during the seven months subsequent to the cleaning not a single case has come thence, though cases have occurred among the road and garden gangs as before.

Major Buchanan concludes therefore that it may justly be accepted that dust is a frequent vehicle for the germ of cerebro-spinal fever, a diplococcus, as has been proved, and offers considerable resistance to desiccation. He finishes his paper by calling the attention of tropical practitioners to the claim of cerebro-spinal fever to be reckoned with as one of

the continued fevers of the tropics.

Lt.-Colonel GILES, I.M.S., remarked that in an epidemic of cerebro-spinal fever watched by him in a jail in the N.W. provinces of India, infection appeared to cling to the building; as after emptying, cleansing and disinfecting the premises, the disease recurred, and that, too, after several such procedures.

#### FOUR CASES OF LIVER ABSCESS: TREATED BY TROCAR AND CANNULA AND SY-PHON DRAINAGE (MANSON'S METHOD).

Mr. James Cantlie gave details of four cases of liver abscess he had treated by Manson's method during the past twelve months. The 4 cases complete a series of 28 cases Mr. Cantlie has treated by this method, with 24 recoveries. Two of the cases that died were the first two he treated; the third he only operated upon but did not treat subsequently; in the fourth case the abscess was only opened for the purpose of relief, not with the idea of cure, the patient being almost comatose at the time. All four cases were intra-hepatic abscesses and all had had dysentery previously. One case was that of a soldier who went from India to South Africa where he contracted dysentery and developed an abscess after reaching England. The second case was that of a man from South Africa who developed "fever and jaundice." He had many attacks of this nature during seventeen mouths, during which time he saw several doctors and had many diagnoses of his case made. Some of the diagnoses were "catarrhal jaundice," "malarial jaundice," "scorbutic jaundice," gall stones, hy datids, &c. The third patient was a marine engineer from China, who after operation developed well-marked pyæmia, but made a good recovery. The fourth patient was a Zanzibaree who was admitted into hospital in a comatose state and was operated upon owing to the distress caused by the pressure of the abscess in the epigastrium.

Mr. Cantlie claimed for tapping by the trocar and cannula and the introduction of a large tube and syphon drainage as the readiest, the safest and most efficient operation for deep seated liver abscesses. When the pus was near the surface it did not matter in what fashion the operation was performed, as the whole proceeding merely amounted to opening what often proved to be a subcutaneous, or at most a subcostal, collection of pus. But with deep abscess on the dome of the liver, pressing upwards towards the chest, operation by cutting or the "free method" was

inadvisable. Transthoracic operation by way of the pleura, the diaphragm and with excision of a piece of rib, was over-heroic surgery and quite uncalled for. It must also be remembered that operation for liver abscess was most frequently performed in the tropics, where, except in the large towns, the surgeon was often single-handed, and to undertake operations on liver abscess by laparotomy or by transthoracic incisions were proceedings that no man single-handed is justified in attempting, seeing that there is a more easy and efficient plan of treatment.

Mr. P. J. Freyer advocated operation by incision, and quoted cases in his practice whereby excellent results were obtained. He had quite abandoned

operation by trocar and cannula.

Dr. G. P. JORDAN (Hong Kong) states that his colleagues and himself in Hong Kong had discarded the trocar and cannula, and now operated by either laparotomy or by transthoracic incisions. He used silver drainage tube in place of rubber, owing to the tendency of the latter to be compressed by the ribs.

Dr. Chisholm (Sydney) said that in Australia pus in the liver was generally secondary to hydatids, and that in these cases operations by incisions were necessary. At the same time he was glad to find that a simple method of operating for simple liver abscess was in vogue, as he was inclined to think that surgeons at the present day, especially the younger surgeons, were inclined to be over-heroic in their surgery.

Dr. Manson, C.M.G., F.R.S., said he had seen both plans of operation followed, and he was inclined to deprecate the all too heroic methods usually practised by British surgeons. By the trocar and cannula, deep-seated abscesses could be safely reached without the complications that were almost certain to ensue

by severe cutting operations.

Capt. W. R. BATTYE, I.M.S., stated that Colonel Hatch, in Bombay, had seen in several cases severe hæmorrhage follow puncture of the liver by the needle of an aspirator. He was of opinion that such hæmorrhage could be more easily dealt with if the wound in the liver had been exposed to view.

Seemel Com \_ Thursday, August 1.

Mr. James Cantlie, Vice-President, in the Chair.
DISCUSSION ON MALARIA AND ITS
PREVENTION.

I.—Notes on Anti-malarial Measures now being taken in Lagos.

H.S. Sir WM. MACGREGOR, K.C.M.G., Lagos, contributed a paper dealing with the question of malarial prevention in Lagos. The two chief scourges of the colony of Lagos are malaria and dysentery and the colony spends one-seventh of its revenue in combating these ailments. As an aid towards prevention it is sought to educate the people in the colony on the subject of malarial infection, and every possible means are being taken to bring this about. The greatest attention also is being given to the prevention of malaria by the administration of quinine, to the use of gauze netting, and to the destruction of the breeding places of mosquitoes. The administration of quinine is being carried out wherever possible

and the greater number of Government officers take quinine regularly as a prophylactic. In all probability the day will come when a man who cannot, or will not, take quinine, will not be sent or allowed to remain in a malarial country. The common method in Lagos is to take daily doses of from 21 to 5 grains. It is, however, impossible to protect the whole population by administering quinine, and the great question comes to be how to protect the native. Mosquito netting as a protection against malaria has the disadvantage that it renders sleeping beneath a mosquitonet almost impossible, so hot and stuffy does the atmosphere become. Muslin has the drawback that it becomes mildewed and rots, but a metallic gauze of galvanised wire netting has proved efficient and less expensive than copper wire gauze. Measures have been taken to diminish the numbers of mosquitoes, but they have proved slow, laborious and costly. The idea that Europeans should live quite apart from natives is, from the administrative point of view, inacceptable. In many inland towns there is little fever, due, no doubt, to the long continued absence of rain during the dry season, whereby the mosquito larvæ are largely destroyed.

#### II .- THE PREVENTION OF MALARIA IN HONG KONG.

Dr. J. M. Young (Hong Kong), in a paper relating to this subject, stated that where Anopheles are found there is malarial fever; and that in every malarious district the parasite of malaria is found in the blood of the children resident there, that Anopheles had been caught in these districts, and that breeding pools occurred in the immediate vicinity. Two distinct varieties of Anopheles were found, namely, A. costalis, and A. sinensis. Germicides, Dr. Young considers to be only subsidiary measures for affording protection against *Anopheles*. The only permanent and effectual method seems to be clearing all long grass and undergrowth, and destroying all breeding places by draining, &c. A cleared area is of immense importance, as no mosquito will fly far, probably not more than 150 Experiments have been made in Hong Kong as to the destruction of mosquitoes and their larvæ by the "natural enemies of mosquitoes," dragon flies, tadpoles and small fish. Dr. Young placed twenty Culex and twenty Anopheles larvæ together in water and found that the Culex larvæ completely destroyed the Anopheles.

#### III.—INOCULATION OF MALARIA BY ANOPHELES.

Capt. C. F. Fearnside, I.M.S., contributed a paper on experiments carried out in the Central Prison of Rajahmandri, Madras Presidency, one of the most malarial jails in India. Infected mosquitoes can only infect a limited number of persons, and to give a successful inoculation a considerable number of parasites must find their way into the blood, otherwise the blood phagocytes destroy them. Of Anopheles fed on persons suffering from malaria, 70 per cent. approximately became infected. Eight persons were inoculated by these mosquitoes, and seven contracted fever. The inoculation period proved to be twelve to twenty-five days for parasites of the summer-autumn and tertian varieties. The prevention of the spread of malaria by means of proof houses and mosquito-

curtains, is out of the question in India, as far as natives are concerned. The destruction of *Anopheles* presents many difficulties, and segregation and the free use of quinine are also attended by almost insurmountable obstructions.

#### IV .- Notes on Cyprus Fever.

Dr. Geo. A. Williamson (Larnaca, Cyprus) stated that the majority of fevers in Cyprus were malarial, and that but few were of the nature of Malta fever with which so-called Cyprus fever was often confounded. The principal types of malarial fever in Cyprus are tertian and quartan and their double varieties. Pernicious malarial fever is now, owing to drainage, &c., less frequently met with than in former days. Most of the mosquitoes in Cyprus belong to the Culex tribe.

## V.—Malarial and Filarial Diseases in Barbados, W.I.

Dr. Geo. C. Low, at present in Barbados, engaged in investigating the diseases of the Colony, contributed a most important paper on these subjects. There are neither malaria nor Anopheles mosquitoes in Barbados. Filarial diseases and the Culex mosquito abound and probably stand to each other as cause and effect. Dr. Low is of opinion that owing to the excellent water supply which is laid on to the houses, the breeding ground of the Culex mosquito in the pools and tanks round dwellings can be done away with. The result of this simple step would be the extermination of filariasis and filarial diseases.

#### DISCUSSION ON THE PAPERS ON MALARIA.

Professor R. Boyce (Liverpool) was convinced that any measures adopted in West Africa, whereby the natives were not protected as well as the Europeans, would not meet with the approval of British West African merchants. He believed that extirpation rather than segregation would be productive of the greatest good.

Dr. EDWARD HENDERSON (Shanghai) said that the tertian type of fever prevailed in Shanghai. He believed that the adoption of preventive measures by Europeans in China would set a good example to the Chinese, but it seemed a hopeless task to get preventive measures against malaria to be adopted throughout the length and breadth of China.

Dr. Manson, F.R.S., stated that the adoption of any one method of destroying mosquito larvæ, to the exclusion of all others, was to be deprecated. Different measures applied to different places. The preventive treatment of malaria by quinine was inapplicable for large populations, but for small communities the plan was possibly expedient.

It seemed an impossible task to compel negroes to take quinine, and the plan recently adopted with that intent by the German Government seemed bound to fail. Dr. Young had referred to the destruction of anopheles by Culex larvæ when placed together. No doubt this was true when food was scarce, but when food is plentiful the two live amicably side by side. In several parts of the world malaria was absent and in others it prevailed; in some places anopheles existed and in others culex,

and yet in a third place the two existed side by side. Could we find out why anopheles lived in one place and not in another, why certain diseases prevailed in one place and not in another, we should be able to attack the mosquito with destructive measures of a natural type, instead of by the chemical and mechanical methods now employed. We had analogies of diseases in plants being thus combated as in the case of the disease of the vines in France, and the orange trees in the United States of America. He objected to any plan of defeating malaria being condemned simply because it was not perfect. An abatement of the disease was a most desirable object and one which should be aimed at when the more radical measures proved impossible.

Col. POYNDER, I.M.S., held that it was impossible to teach the natives of India preventive measures for either cholera or malaria; for they would even drink water after being warned that it would give rise to

cholera.

Mr. CANTLIE stated that he considered the "Swatow Mosquito" lamp used in China a most efficient method of getting rid of mosquitoes within a mosquito net, and that he had induced an instrument maker to make the lamp so that now it could be obtained in London.

#### NOTE ON THE ENTRANCE OF ANKYLOS-TOMA EMBRYOS INTO THE HUMAN BODY BY MEANS OF THE SKIN.

PROFESSOR F. M. SANDWITH (Cairo) read a paper on this subject and stated that it has long been known that ankylostomiasis infection can occur by the mouth, but the intention of the present paper is to draw attention to Dr. Looss's discovery that the embryos have also the power of entering the skin, chiefly by the hair follicles.

In 1898 Dr. Looss announced this fact, but as there is no analogy for a parasite behaving in this way, his paper met with no reception beyond a little hostile criticism.

Like many scientific discoveries, this was the result of a pure accident. While working in the laboratory of the Cairo Medical School, a drop of pure culture of embryos fell on his hand; he happened to examine the drop some minutes later and was astonished to find that it contained countless *empty* embryo sheaths and a few sluggish embryos. The bulk of the and a few sluggish embryos. embryos had apparently entered the skin. His hand became red aud burning and he found himself later suffering from anæmia and debility with evidence of ankylostoma infection in the fæces requiring a prolonged cure. Since then a similar experiment has been made on a human leg one hour before amputation. Sections of the skin showed that the embryos had entered chiefly by the hair follicles. Inside the follicle the embryos push their way towards the hair papillæ during which process, if there are many in the hair follicle, the root sheath of the hair is almost completely destroyed. When the papiliæ are reached, the embryos leave the hair follicle to pierce the surrounding tissue of the true skin. (Centralblatt. fur Bakteriologie, May 31 and July 5, 1901).

A section under the microscope and some micro-

photographs show many embryos in different stages of entry. It is assumed that the embryo finds his way from the skin to the small intestine; but of this there is as yet no proof.

Dr. Looss's researches throw an additional light upon ankylostomiasis infection in many countries, and may lead to an analogous discovery with regard

to Bilharziosis, and perhaps other parasites.

Lieut. Col. G. M. Giles said that he had seen Dr. Looss's specimens in Cairo, and he could confirm all that Professor Sandwith had stated. There is now no doubt that the ankylostoma embryos can enter the skin by way of a hair follicle, but how the ova came afterwards to infect the intestine in the numbers they do can hardly be explained by this method of infection. Col. Giles believes that the parasite gains entrance as ova amongst the dirt on the hands of the coolies in India. The soil is impregnated with these ova especially in the tea-gardens of Assam, and when with unwashed hands the coolie conveys his food to his mouth the ova enter with it and are swallowed.

Dr. Manson regarded the specimen exhibiting the embryo ankylostome entering a hair follicle rather as a curiosity, and would deprecate premature interpreta tion of the fact as indicating a phase in the normal life history of the parasite, or as a method of infection. The active embryo placed on the skin possibly enters the hair follicle for shelter merely. He suggested that the entrance of the embryos of ankylostomata by the skin should be made the subject of closer research, and the experiments might, with advantage, be conducted in this country where the chance of previous infection was nil.

#### DISEASES OF BADAGRY, LAGOS.

By W. F. MACFARLANE.

Assistant Colonial Surgeon, Lagos, West Africa.

I was brought in contact here with most diseases prevalent on the coast; observing cases of fever, dysentery, diarrhœa, ankylostomiasis, foul gangrenous ulcer, yaws, ainhum, craw-craw, guinea worm, ringworm, elephantiasis, leprosy, &c., &c.; but especially would I like to bring forward as most prevalent, and remarkable to this district, dysentery, diarrhœa, ankylostomiasis, foul gangrenous ulcer, the jigger, the mosquito, a peculiar poisonous green fly, and a marked tendency to ptosis on the part of the inhabitants.

DYSENTERY AND DIARRHŒA.

Dysentery is probably more common here than in any other part of the Colony. It is generally of a catarrhal type. There are frequent loose motions at first, later becoming mucoid and bloody, with great tenesmus and griping. The disease, however, is amenable to treatment, and patients rapidly recover under suitable dietary and drugs, and there is but little tendency to chronicity or ulceration (natives). I may state that I have never seen a case of abscess of the liver in a native in the Colony, though dysentery is so prevalent.

A diarrhea taking on peculiar symptoms I first observed at Badagry, and as since then I have seen two cases exhibiting the same symptoms, I take it that this form is pathognomonic, and will describe it. All these cases occurred among Europeans.

The disease begins with premonitory diarrhæa in a patient who was previously in good health. He passes two or three loose motions a day with slight tenesmus. Under ordinary treatment the symptoms improve, but a day or two after, being, as he thinks, practically well, he wakes one morning with a griping pain in the abdomen and rises to go to stool. He passes a small scybalous motion which is bathed in, and followed by, about two drachms of a dirty milky looking fluid. In the afternoon or evening he again experiences the uncomfortable feeling in the abdomen, and another motion of like nature is passed, or perhaps only a little of the fluid.

Except for the discomfort previous to going to stool he keeps in good health. This state of affairs continues for a few days, when he has a larger motion, containing ordinary fæces but followed by a drachm or two of the buff fluid. In the mean time the patient has been eating his ordinary food and sleeping well at nights. The disease is most chronic. The gut may take on its natural function for a week or ten days and then the old trouble starts afresh. It generally lasts for months. Its remission, chronicity, resistance to treatment, and its not appreciably conducing to physical ill-health, are its marked points. After following out various lines of treatment with indifferent success, I found the following formula was useful, but had to repeat the mixture in a fortnight.

 R
 Liquor Bismuthi
 ...
 ...
 1 dr.

 Magnesi Sulphas
 ...
 ...
 60 grs.

 Liquor Hydrargyri Perch
 ...
 1 dr.

 Aqua Chloroformi
 ...
 ad. 1 oz.

 ft. mist.

1 oz. ter in die.

Concurrent with the mixture 5 grs. of quinine was taken each night, rest prescribed, and alcohol and all irritating articles of diet avoided.

It is difficult to determine the causes of this péculiar intestinal disturbance. The factors, I should say, judging from the nature of the stool, lay in glandular enlargement not going on to ulceration. Whether the mischief is brought about by protozoal, or bacterial origin, or by a simple mechanical irritation, I am unable to fathom. Talc, which is common, could, by being swallowed in the water, account for very severe irritation. Small quantities of this substance, by reason of the platelike flat surface of the particles, and their lightness, would adhere firmly to the walls of the bowel and be difficult to dislodge.

#### ANKYLOSTOMIASIS.

Most common in this district. Patients frequently came to me suffering from anæmia, with puffy faces and ankles. These I generally found to be suffering from ankylostomiasis. Unfortunately, not being in possession of a suitable microscope at the time, I was unable to examine the fæces for the ova of ankylostomum duodenale, but excluding beri-beri (the paralytic symptoms of this disease not being present) and malaria (there being no marked

history of fever), I first treated for ankylostomiasis with thymol, and almost invariably ankylostomum duodenale were passed, and the patient rapidly improved.

One case under my observation and treatment was remarkable, showing what grave symptoms this parasite can produce, and how rapid is the recovery

on its expulsion.

A child, aged 4, was brought to me with marked ascites as the prominent symptom. On closer examination I found also effusion into the pleural cavity. Heart sounds and præcordial dulness, normal, no albumen in urine, liver as far as could be judged not enlarged. There was also anæmia, and the ankles were swollen. The history that could be elicited from the mother was vague. Evidently the child had been ailing for the last five or six months; the swelling of the abdomen had been only noticed during the last month. The ascites was so advanced that I raised the question as to the advisability of tapping. Mindful, however, of a somewhat similar case that came under my charge when Resident Medical Officer at the Lagos Hospital, and which, by the advice of Dr. Strachan, the Chief Medical Officer, I first tried for ankylostoma and with success, I resolved to carry out the same lines of treatment here, and first exclude the possibility of the parasite being the primary factor of the present trouble. Having prepared the patient by a light diet of diluted agidi for two days, I exhibited thymol, giving 7-grain doses every three hours for four doses, the bowels having been previously cleared out with castor oil, and a dose of oil also following the last dose. He passed that evening several light coloured motions containing large quantities of ankylostoma. The patient was now put on iron for four days (Parish's chemical food), after which the thymol treatment was again continued, and again worms were expelled. After the fourth such treatment none, however, were found, and the vermifuge was discontinued, and the tonic line of treatment pressed. The little fellow was rapidly improving in the meantime, and the change in his condition was really remarkable. The abdomen became soft, and reduced in size, the swelling of the feet also rapidly subsided, the cachexia diminished, and each day he showed an improvement on the last. In a month after treatment he was able to run about, though he was kept on iron for another month.

Geophagy I found very often associated with

ankylostomiasis.

So frequently are ankylostoma found in fæces of patients suffering from earth eating, cachexia, or dropsical effusions, that except when pronounced symptoms of beri-beri are manifest, or anæmia from any evident cause, it seems sound on the coast to bear ankylostomiasis in mind. Even where beri-beri is suspected ankylostoma will often be found.

That the geophagy should so often accompany this disease, and vice versâ, is curious. Which is primary?—the existence of the worm in the bowel causing the depraved appetite, or the ova of the worm introduced in contaminated earth into the alimentary tract? In both cases anæmia results, both often co-exist, the parasite and the earth-eating habit; the discolouration of skin said to be peculiar

to geophagy I have never found. The earth eaten is of two kinds, the white and the red, and both are found in damp places. The probability is that in all cases of geophagy, if any symptoms arise, the ankylostoma duodenale ova has been swallowed in the earth.

It is curious that Europeans on the coast do not suffer from ankylostomiasis. This can perhaps be accounted for by the fact that Europeans\* boil their drinking water, and that the ova, unlike those of ascaris lumbricoides, are destroyed by heat.

#### JIGGER.

The jigger is the common pest of Badagry and district, very few escaping for many days without becoming a victim, even Europeans, taking due pre-cautions, not being exempt. The usual history is that an intense itching is experienced, generally in the skin at the root of the nail of one of the toes. On examining the seat of irritation nothing much is to be seen; a small dark speck in the skin, surrounded by a slight areola of inflammation only being apparent. This can always be observed, even in the skin of a dark native. So well known is the insect in the district, that the sufferer at once diagnoses the case, and proceeds to treatment. As the native is an adept at this little operation, I will describe it as conducted by himself. Having procured a sharp needle, he gently digs and scratches away the epidermis above and around the dark speck, and soon comes to a buff-coloured round object, varying in size from a pin's head to a small pea, with the black dot apparently adhering to its surface. He has worked down so carefully that he has not injured the round body in any way. Now the operator skilfully passes the point of his needle around and under the tumour, and enucleates it entire and whole. The skill lies in removing the body without causing an unnecessary wound, and also in getting it away entire; for should it be punctured scores of minute ova, resembling the small bodies composing a hard fish roe, are liberated, and though they are scraped out to the best of the operator's ability, a nasty ulcer is liable to form.

Probably the round tumour is the abdomen of the impregnated female jigger, and the black speck its head and thorax. When the abdomen is ruptured the ova escapes into the wound made in the skin. I found that if the part was bathed in a strong solution of perchloride of mercury no bad effects followed this accident. The natural surroundings at Badagry are peculiarly favourable for the growth and development of the jigger. Streets ankle deep with warm sand, moist atmosphere, and proximity to lagoon.

The jigger sometimes causes serious trouble. I have seen cases where the whole surface of one of the toes was ulcerated, swollen, and of a clubbed shape, with the broad end at the ball of the toe. These ulcers emit an extremely offensive odour, as

<sup>\*</sup> Also in the fact that the Europeans here do not eat their food with their hands unwashed after handling earth. When this is done, as in the construction of railway tunnels, &c., by Europeans in certain parts of Europe where ankylostomes exist, ankylostomiasis results.—ED.

the result of non-cleanliness. Complete immersion of the foot in carbolic acid lotion (1 in 40) for a few days, and then dressing with iodoform and boric acid, answers well. The natives frequently lose their toes through this source, and ainhum is not alone accountable for the large number of feet one sees with a toe missing.

#### Mosquitoes.

Mosquitoes and sand-flies abound in this district, and indeed it could not be expected otherwise, so favourable for their well-being is the spot. A stream runs behind the town with numerous swamps in its vicinity, and with many suitable puddles for the development of the larvæ; in front lies the lagoon also with swampy land adjoining in places.

—Annual Medical Report for 1889.

(To be continued.)

## THE PROPOSED WEST AFRICAN HEALTH AND SANITATION COMMISSION.

APPOINTMENT OF MAJOR ROSS AS SCIENTIFIC EXPERT.

A Conference convened by the African Trade Section of the Incorporated Chamber of Commerce of Liverpool was held on July 3, in the Board-room of the Chamber of Commerce. Mr. Alfred L. Jones, Chairman of the Section, presided, and there were also present, representing the African Trade Section of the Liverpool Chamber of Commerce, Messrs. John Holt (Vice-Chairman), Louis Solomon, W. D. Woodlin, A. J. Fontannaz, and James Irvine; representing the West African Trade Section of the London Chamber of Commerce, Messrs. F. Swanzy (Chairman), J. H. Batty, and H. Wallach; representing the African Sectional Committee of the Manchester Chamber of Commerce, Messrs. J. A. Hutton (Chairman), Thomas Welsh, and F. Burman; and Thomas H. Barker, Secretary, Liverpool Chamber of Commerce.

The business discussed had reference to an important proposal made by the Rt. Hon. J. Chamberlain, when he received a deputation from the African Trade Section in March last, relative to health and sanitation in West Africa. The proposal was that the three Chambers of Commerce represented, viz., those of London, Liverpool, and Manchester, should each appoint one of their number to be a member of a commission which should go out to the West African Colonies and inquire into their sanitary condition, the measures that seemed feasible to improve the health of the inhabitants, the probable cost of such measures, and the best way of raising funds to meet it. In addition to these three gentlemen, the Commission should include someone representing the Colonial Office, and a scientific expert nominated by the Chambers.

The first question raised by the Chairman was as to what was to be done in regard to the arrangements for carrying into effect the proposals of H.M. Secretary of State for the Colonies, viz., whether it should be recommended that the Commission should be appointed to proceed to each of the colonies separately, or one Commission to proceed to the whole.

Mr. Swanzy (London) thought that a separate Commission should be sent to each colony.

Mr. Welsh (Manchester) thought that the time required for the Commission to proceed to all the colonies would not be very great, and stated that there were only two ports, Freetown and Sherbro, in the Colony of Sierra Leone, which would require to be visited. The chief difficulty in the way of the speedy accomplishment of the objects of the Commission would be found in Southern Nigeria, owing to there being several centres—Calabar, Benin, Brass, Opobo, &c.

A further discussion as to the time which would be required for the Commission to report on all the colonies followed. Mr. Welsh thought that four to six months would be sufficient. Mr. Solomon here interposed, saying that he thought the conference should first nominate the mercantile members of the Commission, and afterwards discuss the other details, such as the time required for their work, &c. The following gentlemen were then nominated to represent the commercial interests of the three Chambers concerned, viz., Mr. C. Tambacci for Liverpool; Mr. Thomas Welsh for Manchester; and Mr. J. H. Batty for London.

Mr. Batty, on behalf of the London Chamber, suggested October next as a suitable time for the Commission to leave England.

The nomination of a scientific expert suggested by Mr. Chamberlain was next considered, and it was unanimously agreed to nominate Major Ronald Ross as Medical Officer. It was afterwards suggested that a sanitary engineer should be appointed as well as a medical officer, and it was resolved that this suggestion should be communicated to Mr. Chamberlain, who should be asked to consent to this addition to the Commission. In his letter to Mr. Chamberlain the Secretary to the Liverpool Chamber of Commerce says:—

"Health and Sanitation Commission, West Africa.
"I am directed to inform you that a Conference of representatives of the African Sections of the Liverpool, London, and Manchester Chambers was held here to-day, under the Chairmanship of Mr. Alfred L. Jones, to consider further in detail your suggestions on the above subject made to the deputation from the Chambers on March 15 last. The following gentlemen were nominated by the conference to represent the three Chambers as the mercantile members of the proposed Commission, viz., Liverpool, Mr. C. Tambacci; London, Mr. J. H. Batty; Manchester, Mr. T. Welsh, subject to the approval of the respective Chambers.

"In regard to your suggestion that a scientific expert should be nominated by the Chambers to accompany the mercantile delegates, I am to say that Major Ronald Ross was nominated as the medical officer of experience in that capacity. Further, it was agreed to be desirable that a sanitary engineer should accompany the Commission; and I am to ask whether, if such an expert be nominated, you can see your way to confirm the appointment. It was suggested that the month of October would be a suitable time for the departure of the Commission."

Mr. HUTTON (Manchester) suggested that the

Chambers of Commerce on the West Coast should be written to in order to prepare them for the arrival of the Commission, and to facilitate its

objects. The suggestion was approved.

It was suggested by Mr. WALLACH (London) that the Hamburg and other Chambers should be informed of the steps that are being taken, in order to give them the opportunity of following the example set by His Majesty's Government on matters relating to the health of the coast.

A luncheon, over which Mr. Alfred L. Jones presided, followed the meeting, and was attended by the delegates at the conference—Mr. Thomas, of Sierra Leone; Professor Boyce, of the Liverpool

School of Tropical Medicine; and others.

#### AMERICAN PEDIATRIC SOCIETY.

Thirteenth Annual Meeting, held at Niagara Falls, N.Y., May 27, 28, and 29, 1901.

AN ACCOUNT OF EPIDEMIC MALARIA IN CHILDREN.

Dr. R. G. Freeman, of New York, presented this paper. The cases were seventy-seven in number, and occurred in the children of the New York Foundling Asylum occupying a certain play-room. Though there were 700 children in the institution, no others were affected. Those in the nursery-room above did not have it. The temperature ranged from 100 to 105 degrees F. All had coated tongues, not red at the edges as in intestinal disorders. None had large spleen. All were given castor oil and put on milk diet. The blood of seven was examined, with negative results at first, though in one instance plasmodium was found later. All received grs. 2 of quinine three times a day, and the temperature fell in twenty-four hours. The oil alone did not cure, so the disturbance was not intestinal. Adjoining the play-room was an excavation, where rains formed stagnant pools. These were present too short a time to permit the development of Anopheles, and neither mosquitoes nor bites were found on the children.

Dr. NORTHRUP told of a case of suspected malaria in an infant of 9 months, in which the bacteriologist

actually killed a mosquito on the infant.

Dr. Packard said that the Anopheles appeared in Philadelphia about June 15. As influenza had previously prevailed, weakened power of resistance might be a factor.

Dr. Kerley reported that he had examined the blood of fifty children with elevated temperature. None had plasmodium, but all got well on quinine

and proper diet. He did not diagnose the trouble as malaria.

Dr. Adams did not consider that malaria was proven, nor evident, except in one case. He saw many cases in Washington, and found the æstivo-autumnal variety required more quinine than others.—Medical Record, June 29, 1901.

#### SANITATION IN EGYPT.

From an article in the *Empire Review* for March, 1901, concerning "What British Administration has done for Egypt," by W. F. Miéville, we gather the

following information :-

"Nor has the work of sanitation been neglected, but the carrying out of this reform has been uphill work. Orientals, though not uncleanly, seem unable to grasp the meaning of the most elementary rules of sanitation. Great strides, however, have been made in this direction. Stagnant ponds, such fruitful sources of disease, have been filled up, and cemeteries moved to healthy sites. The drainage of the mosque latrines into the Nile and canals is now prohibited, and proper reservoirs are substituted for the open ablution basins so common in mosques. Efficient doctors are placed in charge of the hospitals, proper ventilation provided and thorough cleanliness enforced, while public disinfecting stations and separate pavilions for infectious diseases have been erected. But in spite of all that has been done much remains to be accomplished. Reform in quarantine matters has proved even more difficult than reform in sanitation, as the Quarantine Council is an international body in the sense that no less than fourteen different Powers are represented thereon. Patient work combined with a modicum of diplomacy, however, has borne its fruit. The old vexatious and absurd regulations have for the most part been swept away, and the common-sense principle now prevails of treating vessels according to whether they have or have not actual disease on board at the time of arrival in Egyptian waters instead of, as in former times, condemning a vessel as foul simply because she had happened to sail from an infected part."

THE Plague has appeared in Honolulu. Major Blair D. Taylor, of the Army Medical Department. reports that there were four deaths from bubonic plague at Honolulu from May 29 to June 9. His report says that the Honolulu Board of Health has taken every precaution to segregate the inhabitants of infected houses and disinfect them, and the President of the Board believes that he has the situation well in hand. At Hong Kong the disease has broken out in virulent form, and every port in the Orient has quarantined against that place. A United States transport, having on board 180 soldiers and sixteen officers, returning from the Phillippines, was detained at Nagasaki on account of the death from plague of a Chinese fireman. At Hong Kong, since the first of the year, seven Europeans and 542 natives have died of the plague. A British steamer is in quarantine at San Diego, Cal., having lost six of her crew from plague during the voyage from Hong Kong. One death occurred before Honolulu was reached, and five between that port and San Diego. The cases were not confined to any part of the ship, various members of the crew and one steerage passenger being among those attacked. Many dead rats were found in the ship .- Medical Record, June 29, 1901.

HOW PLAGUE IS REPORTED IN CAPE COLONY-A CURTAILED SPECIMEN OF THE WEEKLY BULLETIN.

N.B.—The analysis of Males and Females under separate races is omitted in this reproduction owing to want of space in the Journal.

Sm,—I have the honour to inform you that the following is the report on the state of the outbreak of Bubonic Plague in the Cape Colony, for the week ended July 6, 1901, namely:—

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I have the honour to be, Sir,
Your obedient servant,
A. JOHN GREGORY.
Medical Officer of Health for the Colony.

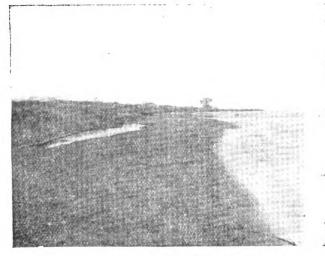
To.....

## News and Notes.

Mosquito Breeding Places.—The two accompanying photographs (reproduced by permission from West Africa, May 11, 1901) will prove of interest to all those who are engaged in attempts to exterminate mosquitoes by destroying their breeding places.



A GRASSY HAUNT OF MOSQUITOES IN THE SHIRE RIVER.



Breeding Ground of the Malarial Mosquito on the Shore of Lake Nyassa.

The magnitude of the task may be gauged and its difficulties appreciated by glancing at the photographs.

LECTURE ON THE MALARIAL MOSQUITO.—Major Ross gave a lecture on July 18 on the malarial mosquito, in the Wilberforce Hall, Freetown, the Governor presiding. A resolution was unanimously passed in support of the efforts of the Liverpool malarial mosquito expedition, whose employés are engaged all over the town in destroying the breeding places of the insect.

## Current Miterature.

#### MALARIA.

The Transportation of Mosquitoes in Baggage—A possible Explanation of some Epidemics of Obscure Origin. By V. Havard, M.D., Surgeon U.S. Army.—Concerning the part played by the mosquito in the transmission of malarial fever and yellow fever, the following extract from a letter recently received is interesting and throws a sidelight on what sceptics call the difficulties of the doctrine. The writer of this letter (Dr. L. S. Harvey, U.S.A.) is a very intelligent, well-informed observer, and, I believe, entirely trustworthy.

"In regard to the possible carrying of infected mosquitoes in baggage I had an experience last fall, which, while perhaps frequently observed, may be of interest at this time. A chest packed by me was left open for many days prior to my leaving Baracoa, in a room where there were many Culex mosquitoes. The chest was closed, covered with a tightly fitting canvas cover and roped, and was not opened until my arrival in Washington some sixteen or seventeen days later. When the chest was opened, I distinctly saw at least three mosquitoes of the well-known Baracoa variety fly out of the trunk. This may be a common experience, but since the mosquito theory has been promulgated, I have frequently thought how easy it would be to account for the outbreak of yellow fever at Fort Monroe by just such an experience as mine."

This observation is particularly interesting to those of us who have followed Major Reed's experiments in Havana and have become convinced that the mosquito, or rather one species of mosquito, is the usual and probably the only transmitter of yellow fever, at least in Cuba. It explains the breaking out of this disease in places not known to have been infected, and those rare cases occurring at points far removed from foci and attributed to

tainted clothing or other formites.

This observation also invites attention to our own experience of the physical endurance and resistance of mosquitoes, especially in tropical or semi-tropical regions where they exhibit a nimbleness, swiftness, and longevity unknown in more northern climes. Thus, who has not slapped a mosquito with such force as to break one or more of its legs and bruise the abdomen, and, on lifting hand or finger, has not been surprised, and not a little provoked, to see the insect wriggle off and fly away? If, while a trunk is being packed and left open for that purpose, mosquitoes light in it, it is not unlikely they may become caught between the folds or layers of clothing, and I doubt very much whether the usual amount of pressure put upon the contents of a trunk, when closing it, will destroy those which have found refuge in the many spaces existing in corners, inside the trays, or between garments.

It then clearly behoves all who live in or near foci of yellow fever, malarial fever, or filariasis to exercise some caution in packing trunks, chests, and boxes, so that the existence of these diseases may not constitute a sufficient reason for the continuation of the very troublesome and more or less destructive process of steam and formaldehyde disinfection.—Med. Record, June 22, 1901.

Major Ross, F.R.S., on the Discoveries of PROFESSOR GRASSI .- In Il Policlinico, May 10, 1901, Major Ross repudiates as untrue the following assertion of Grassi: (1) That he exhibited one of Grassi's preparations at a London medical meeting. (2) That he asserted that he had succeeded in infecting people by the drinking of water. (3) That he asserted that his grey mosquitoes transmitted tertian fever. (4) That he did not complete the cultivation of the human parasites in India because he was not able to do it. B. Grassi replies at length and still holds to his former conviction.

#### HAMLET'S AGUE PILLS .-

Tak	e of—						
	Sulph. quinine					2 drs.	
	Powd. myrrh					1 dr.	
	Powd. capsicum						
Mix	. Make sixty pills.	-Ind	ian Me	d. Rec	ord, J	une 19,	1901.
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	Gaz., July 6, 1901.						

#### PLAGUE.

WATER WASTE.—Mr. De Winton writes: "I saw it stated in a medical journal lately that the provision of a water-supply under pressure to towns often increases rather than diminishes their unhealthiness because of the woeful waste that goes on, and the numerous puddles of water all over the place, these forming breeding places for mosquitoes. This could be stopped by making the people pump their water by hand, which would be no more labour than they are accustomed to when drawing water from wells .- Indian Engineering, June 15, 1901.

A BUST of Dr. Armaner Hansen, to whom is due the honour of having discovered the bacillus lepra, will shortly be unveiled and placed in Lungegaards Hospital, Bergen. Professor R. Virchow, President of the Committee, is forwarding invitations to all the medical men of renown to attend the ceremony of unveiling the bust.

#### Letters, Communications, &c., have been received from :-

B.—Dr. Chas. Begg (Bath); Dr. E. B. Barnet (Havana;) Dr. James Berry (London); Dr. O. Baker (London).

C.—Dr. Attilis Caccini (Rome); Dr. E. J. Cowen (India).

E.—Dr. M. D. Eder (Palmira).

G.-Dr. B. Grassi (Rome). H.-Dr. Stanford Harris (Güimar); Dr. A. H. Hanley (Dublin); Dr. Robert Howard (Essex).

L.-Dr. Ovideo Lemas (Sao Paulo); Dr. D. Landsborough

(Kilmarnock).

M.—Dr. Patrick Manson (London); Dr. Neil Macvicar (Blantyre); Dr. J. Moore (Texas); Dr. Marks (Brisbane).
W.—Lt.-Col. H. R. Whitehead, R.A.M.C. (Punjab).

#### EXCHANGES.

Annali di Medicina Navale. Archiv für Schiffs u. Tropen Hygiene. Archives de Medicine Navale. Archives Russes de Pathologie, de Médec., Clinique et de Bacteriologie. Australasian Medical Gazette. Boletin de Medicina Naval. Boston Medical and Surgical Journal. Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology. British Medical Journal. Brooklyn Medical Journal. Climate. Clinical Journal. Clinical Review. Giornale Medico del R. Exercito. Hongkong Telegraph. Il Policlinico. Indian Engineering.
Indian Medical Gazette. Indian Medical Record. Janus. Journal of Balneology and Climatology. Journal of Laryngology and Otology. Journal of the American Medical Association. La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal. Medical Brief. Medical Missionary Journal. Medical Record. Merck's Archives New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyclinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo. The Hospital. The Medical and Surgical Review of Reviews.

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#### Motices to Correspondents.

- 1.—All communications will be acknowledged in the JOURNAL under the heading "Letters and Communications Received." Contributors who do not see their names in the list should communicate forthwith with the Editors or Secretary.
  - 2.—Manuscripts sent in cannot be returned.
- 3. As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
- 4.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.
- 5.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Editors.
- 6.-Correspondents should look for replies under the heading "Answers to Correspondents."

## The Journal of Tropical Medicine.

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In order to meet the constant enquiry for addresses of respectable firms catering for the various requirements so difficult to obtain abroad, we give a list of names and addresses which we trust will be found useful to our numerous correspondents and subscribers.

#### AN ADDRESS DELIVERED AT THE OPEN-ING OF THE SECTION OF TROPICAL DISEASES.

By Ronald Ross, F.R.C.S., F.R.S., Major, I.M.S. (Rtd.)

Lecturer in Tropical Medicine, University College,

Liverpool.

I BEG to express my regrets that I am unable to present my address to the Section in person.

I have great pleasure in being able to record for the last year a general and perhaps unparalleled advance in our knowledge regarding tropical diseases.

#### Yellow Fever.

The discovery of at least one mode of infection in yellow fever-a discovery of the highest importance to mankind—emanates from America. For some time past several of our American colleagues, stimulated by recent observations in connection with malaria, have sought an experimental verification of the hypothesis of Finlay and others, that yellow fever also is communicated by the bite of gnats. Insects fed on patients were subsequently induced to bite healthy persons who volunteered for the experiment. The results were negative until the gnats were kept for an interval of twelve or more days between the two operations. Success was now immediate. Drs. Reed, Carroll, and Agramonte record in their last report that out of seven non-immune persons subjected by them to the bites of infected mosquitoes, six yielded undeniably positive reactions. same time, seven non-immunes whom they en-deavoured to infect by means of the fomites of patients under peculiarly favourable circumstances, remained in every case free from the disease.

The experiments were conducted under the most stringently scientific conditions. Although the mosquito theory of yellow fever does not possess the parasitological basis of the mosquito theory of malaria, yet the differential observations of Reed, Carroll, and Agramonte are of a nature to leave no doubt concerning the soundness of their conclusions.

Some of the tests have involved great heroism on the part of those who were subjected to them. Since the death of Dr. Jesse W. Lazear we have to deplore that of Dr. Walter Myers, one of our most promising young pathologists, who lost his life from yellow fever when on a deputation from Liverpool to study that disease.

If the pathogenic organism of yellow fever, hitherto undiscovered, prove to be a vegetable organism, the fact will suggest that transference by suctorial insects and arachnids, with which we are already so familiar in the case of animal parasites, may be no less common in the case of vegetable parasites. A priori there is nothing improbable in the view that suctorial insects may become generally infected by blood containing schizomycetes, which may next find their way by route of the insects' salivary glands or otherwise into a fresh host. There are certainly some epidemiological facts which suggest the possibility of infection by gnats in undulant fever and perhaps leprosy, and by other vermin, in relapsing fever, typhus, and perhaps several skin diseases.

Ankylostoma Duodenale.

Another important advance is contained in the confirmation of Giles's life-history of the ankylostoma duodenale by Annett—details of which will shortly be published. These observations throw a vivid light on the route of infection adopted by these dangerous and widespread parasites.

### Undulant Fever.

Owing to observations made by Wright on the scrum reaction in undulant (Malta) fever, this disease has been shown to exist in India, Hong Kong, the United States, the West Indies, and Brazil—a most important fact in connection with the great subject of tropical fevers.

#### Malaria.

The recent advance in our knowledge of malaria has been well maintained by numerous observers.

The practical side of the mosquito theory, which at once became predominant after the determination of the life-history of the parasites, has been energetically treated by Koch and his assistants, who have successfully dealt with malaria on a large scale by means of quinine. Similar work has been performed with success in the United States, and, according to reports, in Italy. In British possessions isolated efforts to deal with malaria according to the new principles have been made by Sir William MacGregor and Strachan at Lagos, and by Thomson and Young at Hong Kong; but the country generally has not adopted an intelligent attitude in this connection.

On the other hand, British workers have closely studied details of the malaria question in many parts of the world. We must refer especially to the good work done in Central and West Africa by the Malaria Commission of the Royal Society, and to an admirable sanitary survey of Nigeria made by the Liverpool expedition during the last year. Direct cultivations of the parasites have been reported by Daniels, Ziemann, van der Scheer and van Berkelom, and Woldert in various countries—all in Anopheles; while Manson has completed an interesting crucial experiment for the popular demonstration of the theory by infecting healthy persons (T. Manson and Warren) in London by mosquitoes brought from Italy, and by simultaneously preserving others (Sambon and Low) in health in the Campagna in a mosquito-proof house. Nuttall and Shipley, Christophers and Dutton have closely examined the anatomy of gnats. Nuttall, Cobbett, and Strangeways-Pigg have made interesting researches on Anopheles in England, in which, by the way, cultivation experiments have hitherto failed. Gosio, Giles, Reinhold Ruge, Fearnside, Neveu-Lemaire, and others, have done useful work on the subject in many directions. It remains, however, a matter for regret that stronger efforts have not been made to determine the reason why individual gnats of an amenable species so often resist infection. this difficulty is cleared away negative experiments with Culex cannot be entirely convincing.

Since the last annual meeting of the Association the mosquito theory of malaria has received the highest scientific acceptance in the address of the President of the Royal Society, Lord Lister.

#### Filariasis.

In regard to filariasis the discovery of Low and James has been confirmed and amplified by several observers. Manson has suggested the possibility of reducing lymphatic varix by leading a lymphatic duct below the stricture into a neighbouring vein.

#### Plaque.

The prompt suppression of plague in Glasgow has further demonstrated the value of energetic sanitary measures in this disease; and the large demand for plague vaccine gives encouraging evidence in favour of Haffkine's prophylaxis.

#### Beri-beri.

The close clinical similarity of beri-beri and chronic arsenical poisoning seems to suggest that

many cases attributed to the former disease may possibly be in reality due to arsenic.

Work for the Future.

It seems to me that further researches are at the present moment most urgently required in connection (1) with tropical fevers; (2) with the flora and fauna of the intestine in tropical bowel complaints; and (3) with the question whether European children in the tropics suffer as frequently from malaria as do the children of natives. The practical necessity of taking measures against the uncontrolled propagation of gnats in tropical cities is one which, in view of recent discoveries, can no longer be set aside by sanitary authorities without dereliction of duty.

The profession owes its sincere thanks to all those gentlemen who have done so much during the past year—often without remuneration and at considerable personal risk—for the cause of tropical medical science. It also owes its thanks to those British merchants who have generously subscribed large sums of money for the prosecution of many of the

researches to which I have referred.

## British Medical Association.

(Continued.)

Abstract of Proceedings. Thursday, August 1, 1901.

CAUSATION OF ENTERIC FEVER IN INDIA.

Dr. Andrew Duncan (London), Lt.-Colonel, I.M.S., (retired), contributed a paper on the "Ætiology of Enteric Fever in India." He first drew attention to some of the theories that have been upheld concerning enteric in India.

(1) The vicarious theory of Martin. According to Martin, hepatic activity in India is followed by insufficiency of action, and a vicarious and abnormal activity of the intestinal glands supplemental to the hepatic insufficiency. This condition terminated in suppurative enteritis, followed by an idiosyncrasal predisposition of the glands to this abnormal state.

(2) The transformation theory of M. Colin. Primary paludal infection may be transformed into enteric fever, or enteric fever may be spontaneously

developed from all acute febrile states.

(3) The theory of Surgeon-General Moore, who regarded no fever as specific; typhoid fever is merely to be regarded as a phase of fever, not a specific disease, the enteric spots being merely a petechial eruption.

(4) The theory of Sir Joseph Fayrer that fæcal poisoning cannot be attributed as the cause of enteric in every instance, but that climatic and telluric conditions play a large part in the ætiology of the disease

in India.

(5) Surgeon-General Gordon, of Madras, at one time advanced the theory that enteric fever did not exist in India.

(6) Sir Anthony Home held that in all fatal cases of fever in which at the *post mortem* any ulcerations of the intestines were found were to be regarded as enteric.

Dr. Duncan stated that the factors concerned in the evolution of enteric in India are: (1) the yearly advent of a large number of soldiers and others at an age most likely to contract the disease; (2) the country presents an environment most favourable for the propagation and spread of the disease.

As regards the spread of the disease, there seems every reason to believe that the soil of many parts of India is contaminated largely with the bacillus of Eberth, and that the soldier imbibes the organisms whilst away from barracks by drinking "native" concoctions in the bazaars. Everywhere also in India are dust storms met with and flies abound, both contributing to infect those who have not acquired an immunity to the disease.

As regards prevention, one method of dealing with the trouble is to burn the stools of the enteric patients. The urine also must be dealt with, for it has been shown to contain the bacillus for even a longer time

than do the motions.

Dr. Duncan advocated inoculation as introduced by Professor Wright, of Netley, and he claimed that the published results of this treatment deserve to be acknowledged as a success. The record in India in 1899 showed that the percentage of strength to cases of typhoid was: amongst the inoculated '98 cures, with '2 mortality in 4,502 cases. Amongst the non-inoculated, 2.54 cures, with '5 mortality in 25,851 cases.

According to Dr. Duncan, a number of hospital returns in South Africa show a favourable result due to inoculation. In Egypt and Cyprus, and in the great epidemic at Maidstone, the evidence of the prophylactic power of Wright's anti-typhoid fluid was very

apparent.

Dr. A. CROMBIE, Lt.-Col., I.M.S. (retired), did not believe that typhoid was so commonly met with in India amongst natives as amongst Europeans. some parts and amongst certain peoples the disease was prevalent, whilst in other parts it was almost unknown. Thus, among the Ghoorkas typhoid was very common, whereas in Madras and Lower Bengal enteric ulcerations were seldom found post mortem. Dr. Crombie mentioned an observation pertinent to the value of Widal's reaction. He examined the blood of three natives of Bengal under the age of 30, living in London, and of three, of similar race and similarly placed, over the age of 40. The blood of the first group of cases gave well marked Widal reaction, although the men appeared in good health, nor had they ever been laid up with typhoid, nor were they ill at the time of examination. Of the cases over 40 years of age that were examined, no reaction fell with Widal's test. Dr. Crombie believes that there are fevers which run a twenty-one days' course in India, in which there is no eruption, no diarrhœa, and but occasionally an enlarged spleen, which are not typhoid at all. In South Africa 75 per cent. of the cases returned as typhoid gave Widal's reaction. Concerning the value of Wright's antityphoid inoculations, he had noted that of 300 cases convalescent from typhoid in South Africa 60 per cent. of the 300 had been inoculated once, and 10 per cent. inoculated twice. He knew of one case inoculated a second time with six months' interval between inoculations to

have had typhoid two months after the second inoculation; second attacks of typhoid were not uncommon.

Capt. Battye, I.M.S., stated that, with the idea of testing the method of spread of typhoid, an experiment had been made in India in which servants were made to rinse their hands in water in a common basin; but although they continued to do so for many days the bacillus of Eberth was not found in the water in the basin. Capt. Battye believed that a harmless organism may become pathogenic under certain conditions, such as the presence of decomposing matter would engender.

engender.

Lt.-Colonel POYNDER, I.M.S., said that enteric in India was probably a disease of youth, and that it was possible the men mentioned by Dr. Crombie, as being over forty and giving no Widal reaction, in all probability had had the disease in their youth.

Professor Sandwith (Cairo) held that the antityphoid inoculation method of Wright was not yet complete in any way. We scarcely even know what we are injecting, and the after effects are very uncertain. Professor Sandwith mentioned that of twelve nurses who went to South Africa three got typhoid although none of them died. He advocated systematic blood examination when Wright's treatment was being tried.

Friday, August 2, 1901.

Dr. Max. F. Simon, C.M.G., in the Chair.

MALADIES OF EUROPEAN CHILDREN IN
HOT CLIMATES.

Dr. A. Crombie (London), Lt.-Colonel, I.M.S. (retired). This paper consisted of a careful enquiry into the comparative rates of illness of British children at home and in India, and of the mortality therefrom. Dr. Crombie's experiences were gained in Calcutta during a long residence, and the patients were the children of (military and civil) parents resident there. Speaking generally of the children of the civil population, it may be said that the sick rate of European children is lower in India than it is in the United Kingdom. When, however, the death-rate is considered, there is a material difference, the death-rate of soldiers' children in Britain being but 18:31 compared with 41:09 per thousand in India. Illnesses in India are therefore much more fatal.

	A	Mmissi	on rat	e	]	Death	rate		Case	per cent.
	Britain	India	Britain	India	Britain	India	Britain	India	Britain	India
			*	*			*	*	-	
Eruptive Fevers	94.9	68.9	26.0		1.27	1.82		0.55	1.3	2.7
Malarial Fevers	1.7	97.3		95.6	0.0	2.18		2:18		2.2
Other Fevers	4.2	18.0		14.8	0.0	0.55		0.55		3.0
Tubercular Disease	2.3	8.1		0.8	0.98	0.78	'25		43.2	23.5
Debility, etc Other General	18.0	38.4		20.4	0.98	12:36		1.38	5.4	6.1
Diseases Diseases of	27.8	17.8	10.5		1.73	8.45		1:72	6.3	19.3
Nervous System	9.3	10.0		0.7	2.80	5.82		3.02	30.4	58.2
Respiratory ,,	134.9	68 0	65:9		. 4'46	6.91	1	2:45	3.3	10.5
Digestive ,,	103.2	96"2	7:3		3.71	13.69		9.38	3:5	13 4
All Diseases	507.3	527.1	T	19.8	18:31	41.00		22 75	3'6	7.8

This table is a very instructive one, and shows that when the cases of malaria are described as not being common to both Britain and India, the admission rate in India is reduced to almost 100 per 1,000 less than it is in the United Kingdom. Even including malaria the table shows that the admission rate for soldiers' children in India is only 19.8 per 1,000 in excess of the admission rate in Britain. The table also shows that apart from malaria the eruptive fever and diseases of the respiratory apparatus claim the greatest number of victims. Measles prevails and during 1899 measles occurred almost as frequently amongst European children in India as at home, being 60 against 63 per 1,000; but measles proved more fatal in India than in Britain, the actual numbers being 2.4 per cent. against 0.9 per cent. Scarlet fever is a rare occurrence in India, but occasionally outbreaks of the disease occur.

Of the respiratory disorders it may be said that the children in India have the advantage as regards the chances of attack, but the mortality amongst them is much higher than amongst children similarly afflicted in Britain. Pneumonia is, according to Dr. Crombie, a very prevalent ailment in India amongst all races, but its presence is frequently returned as fever; he considers pneumonia next to cholera, the most formid-

able disease met with in practice in India.

As regards the digestive system it comes somewhat as a surprise to find that, the generally expressed opinion that whereas the brunt of disease is borne by the chest in cold climates, it falls on the digestive organs in the tropics, is not true, comparatively speaking. Dr. Crombie brought forward statistics showing that the admission rate amongst European soldiers' children in India was less than what occurred at home; but the gravity of the illnesses, however, reverses the picture, for they are almost six times more fatal in India than in Britain.

Dysentery is a disease difficult to define and it is apt to be confounded with rectal catarrh or proctitis, &c. Tormina, tenesmus and bloody mucus in the stools, are not diagnostic of dysentery, but of several intestinal ailments. The general term dysentery, however, has come to be applied to many lesions associated with intestinal flux; hence the cures by various specifics so often heard of. Now it is the ipecacuanha treatment that is in favour, or the saline treatment is fashionable; whereas for the usually transient ailment entitled dysentery, but more often, in fact in 90 per cent. perhaps of the cases, it is mere rectal catarrh, warmth to the abdomen, rest in bed, and purgatives, followed by Dover's powder, would equally well effect a cure.

It is notable that children in India do not have liver abscesses however prevalent dysentery may be amongst them. The fact is that few children have real dysentery, but should they have it, the dysentery is evidently not of that type which is followed by liver

abscess.

The term "Other General Diseases," mentioned in the table above, includes whooping cough, mumps, anæmia, and immaturity at birth. Rickets is very uncommon amongst natives of India, this may be accounted for in some measure by the fact that native women nurse their children more frequently than the mothers of Western Europe.

Simple continued fever is a form of illness in India which claims many victims. It is a name given to a continued fever of a good many days' duration, which may extend to twenty-one days, but which does not present the usual clinical features of enteric fever and on this account the graver name of enteric has been withheld. In South Africa 75 per cent. of cases returned as simple continued fever gave Widal reaction so that it was necessary either to review the diagnosis or enquire into the value of Widal's test. It is a fact that a very large percentage of natives of India, who are not suffering from any febrile condition, and who have never, or certainly, not for many years, suffered from any fever which could be, by any possibility, diagnosed as enteric fever, give the reaction in a perfectly characteristic way.

#### TUBERCULAR DISEASES.

Amongst natives of India it seems to be generally conceded that tubercular ailments amongst children are uncommon. Chevers, for instance, states that he never saw a case of enlargement of the glands of the neck from tubercle amongst native children in the plains of India.

Tabes mesenterica is very rarely seen amongst natives, but European children formerly suffered from the complaint to a considerable extent in India. In recent years, however, the returns under this heading

have become much fewer.

The lessons conveyed by Dr. Crombie show that while European children in India enjoy a certain relative degree of immunity from some of the diseases prevalent in childhood, especially as regards respiratory diseases and the eruptive fevers, "other general diseases," and to a slight extent diseases of the digestive system, their death rate and the case mortality from all diseases, with the solitary exception of tubercle, is higher than those prevailing in the United Kingdom amongst the same class

Dr. Edward Henderson (London), in discussing Dr. Crombie's paper, said: "My personal experience regarding the health of European children in hot climates has been gained in the sub-tropical climate of Shanghai during the thirty odd years I have been engaged in active general practice there. I have always in Shanghai had a large number of children under my care, and have had ample opportunity of watching their growth and development under the different conditions of continued residence in China, or in the majority, a life interrupted by more or less frequent and lengthened intervals spent in Europe.

Of course the man who practises in a sub-tropical climate wants something of the experience of the man who does his work entirely in the tropics; but, on the other hand, he has the advantage of being able every year to contrast the health which his patients enjoy in cool or even cold weather with their condition when subjected to tropical heat. In Shanghai these climatic changes are always well marked, and our summers there are seasons of tropical heat lasting for nearly four months.

The effect of tropical heat on the European constitution is as a rule unfavourable; and children appear to suffer more in this way than adults. Anæmia and loss of tone are always more or less apparent in

European children after a summer spent in Shanghai. Disease, too, during hot weather alters in character somewhat, affecting at that time the digestive organs, chiefly in the form of diarrhœa, dysentery and infantile cholera.

While it is evident that heat is the principal cause of this deterioration and these diseases, it is often difficult to say in what way exactly it has acted in individual cases. Heat causes general enfeeblement of the nervous and muscular systems, and through these affects the digestive organs, depriving the child of appetite, and making the assimilation of what food he is able to take, a more or less difficult process. Heat probably favours the development of the specific germs on which such diseases as epidemic diarrhæa and dysentery depend. In addition, heat causes the rapid decomposition of all food stuffs; making much which is, under ordinary circumstances, perfectly wholesome, injurious or even positively dangerous; and milk, which is or ought to be the staple food of children, is peculiarly apt to suffer in this way.

Of the more remote effect of tropical heat when long continued, I may mention the too rapid growth of children at the expense of general development. I have been quite often told by parents who have taken children home to England, that after their arrival there they stopped growing for a time, though gaining in weight and strength. The cycle of Nature, both animal and vegetable, is shorter in the tropics—the girl becomes a woman at an earlier age. Maturity is sooner reached, and decline hastened. The practical outcome of all this is that the European ought not to be allowed to spend more of his young life in the tropics than can be helped. At the age of from 4 to 7 he should be sent to Europe and kept there until growth is fairly well completed.

Time presses and in what I have still to say I will confine myself to a few general considerations regarding the disorders which affect the alimentary canal; the most common form of illness which the doctor who has children under his care in a hot climate is called on to treat.

In the treatment of diarrhœa success will, I believe, usually be found to lie in the general management of the case; drugs playing a comparatively subordinate part. In the first few hours of alimentary canal disturbance which threatens to develop into a case of infantile cholera, the principal point is to stop the giving of food altogether, especially cow's milk. In such cases beef juice, or egg albumen diffused in water, comes in well later; and brandy is often of great service. The thirst from which the little patient suffers needs constant attention, and water must be given freely whether rejected afterwards or not. mention these points to illustrate what I mean by general management; of drugs in this disease I know of nothing better than calomel, in small doses, frequently repeated. Whatever be the cause of infantile cholera—whether a specific germ or only the decomposition of naturally wholesome food-there can be no doubt that bottle-fed infants are much more apt to suffer from it than those who get their natural nourishment from the breast.

Milk is a food which so easily decomposes in hot weather that in the tropics its condition needs con-

stant attention; and the feeding of infants, which must be done at night as well as during the day, becomes a very difficult matter indeed for the nurse. Add to this that we have not always in the East an active and intelligent staff of officials to look after public dairies; and the native dairyman is emphatically not a man to be trusted.

If, as often happens in hot climates, the European mother is unable to nurse her infant, a good wet nurse should be always provided; and she can usually be easily got among the natives, if ordinary care be taken in her selection. I speak of course from my own

experience in China.

In France a special form of diarrhea used to be described under the name of "diarrhée sudorale," in which the mucous membrane lining the alimentary canal sympathised with the excessively acting skin. And excessive perspiration in children should always receive attention. It is difficult to keep children who are able to run about, under a punkah; but in hot weather a punkah in the nursery, pulled during the hottest hours of the day, at the time of the siesta, which children should always be encouraged to take, is of great service in maintaining health. In very hot weather the child should sleep on soft matting, such as we know in China under the name of Canton matting; and a night punkah is often valuable; of course a child who sleeps under a punkah at night should be sufficiently clothed, and always have the abdomen covered.

Among the outside causes which sometimes excite or may aggravate bowel disorders, the possible presence of intestinal worms should in the East always receive attention. From what I have myself seen I believe that lumbricoides are much more common abroad than in England. The presence of these worms may be unsuspected, as apparently they may The presence of these exist for quite a long time, and even in considerable numbers, without causing any evident departure from health. I have myself seen on more than one occasion the vomiting of one of these worms as the first recognised sign of their presence. Sea sickness in children returning from the East is often attended with an occurrence of the kind. I have said that in treating diarrhoa the general management of the case is usually of most importance, but I quite admit that when medicine is given our modern pharmacopæias have much to offer of value in the bowel antiseptics which arrest fermentation, and the astringents which pass through the stomach unchanged to act on the intestine.

Dr. Manson, C.M.G., F.R.S., asked Dr. Crombie for a definition of dysentery, and what he means by true dysenteries in children. He also requested information upon the presence of diphtheria, trismus neonatorum, and hypertrophic cirrhosis of the liver in India. Dr. Manson also asked for some information as to whether European children showed proclivities similar to Mahommedan children. He agreed with Dr. Henderson's remarks concerning the advantages to the health of European children accruing from being breast-fed, in preference to being bottle fed, and said that when the mother could not suckle the infant it was wise to obtain a native wet nurse.

Major W. H. BURKE, I.M.S., stated that he should

like to endorse the opinions expressed by Colonel Crombie regarding the rarity of enteric fever amongst natives of India. He had treated many cases of enteric amongst Parsees, and also amongst what may be called the scions of noble houses, sons and relatives of native chiefs; the Parsee has no caste prejudices and the Rajah is above them! This seems to me to bear out the deductions Colonel Crombie drew.

On the other hand, Colonel Crombie stated that tuberculosis was not common amongst natives in India; whereas, at present there is an immense amount of tuberculosis amongst natives in Bombay. He was of opinion that Colonel Crombie had not dwelt sufficiently on the unhealthiness for European children, of the rainy season in India, nor on the functional weakness of the livers of European children in India.

Mr. Cantlie (London) stated that trismus neonatorum was very prevalent amongst the Chinese infants in Hong Kong, and that the deaths from trismus formed 50 per cent. of the total mortality of the population. He had seen a death from trismus in a European infant; the monthly nurse in this case was also a European, but she came straight from a convent where trismus amongst infants is always rife and no doubt conveyed the infection. Tuberculosis was prevalent enough amongst Chinese, but the half-castes suffered more than any other section of the community. In fact, the proportion of half-caste women that lived to 30 years of age was very small indeed.

Dr. CROMBIE, in reply, said he could not define dysentery but considered ulceration of the solitary glands an essential feature of the disease. Diphtheria and trismus were common in Calcutta, but hypertrophic cirrhosis of liver is unknown amongst European children in India; it is frequent amongst Hindoos but Mahommedans are exempt.

## SOME OPHTHALMIC COMPLICATIONS OF PLAGUE.

Major F. P. MAYNARD, I.M.S., F.R.C.S., Civil Surgeon of Patna, communicated a paper on this subject. During the epidemic in Patna he met with twelves cases of plague in which eye disease complicated the illness. Of the twelve patients examined, six recovered with one eye sound, for the remaining eighteen eyes the lesions were: (1) cornea hazy in four, opaque in two, and sloughing in four; (2) iritis varying from a few spots of pigment on the anterior capsule to occlusion pupillæ, in twelve cases, and in three others the iris was prolapsed; (3) scleral staphyloma occurred twice, in both it was ciliary and in each the dark projection was separated from the corneal margin by a strip of healthy looking sclera; (4) the lens was hazy in seven eyes and quite opaque in five; (5) the media were hazy in six; (6) the fundus was normal in three, showed hæmorrhage in one, and the appearance of a limited retinitis pigmentosa in one other; (7) the tension was diminished in twelve cases, normal in the rest; (8) vision nil in five, perception to light only in eight, and fairly good in five.

The most remarkable feature in the post-mortem examination was, that whereas in plague extensive hæmorrhage occurs in different parts of the body, in

only one eye was some slight extravasation seen. Except in one case, perhaps, treatment was of no avail. For this case Major Maynard administered iodide of potassium and nux vomica internally, dropped atropine into the eye and applied blisters on the temples.

## SOME REMARKS ON ASYLUM PRACTICE IN SINGAPORE.

Dr. W. GILMORE Ellis, M.D., M.R.C.S., Medical Superintendent Singapore Lunatic Asylum, commenced his paper by describing some of the difficulties which he met on his first arrival at his post. These difficulties consisted for the most part in defects in the asylum, both general and also particular in relation to a large proportion of the inmates; the use of mechanical restraint; the lack of good and reliable records; and last, but not least, the difficulties in connection with the many languages and dialects spoken by the patients. He described also the great difficulty which must always exist in obtaining anything like correct histories of the majority of patients, who are for the most part caught by the police and sent to the asylum as "wandering" lunatics.

As in India, so in the Straits, the majority of patients belong to the lowest classes, with minds not calculated to grasp anything outside the commonest relations of life, and they are often admitted in the poorest physical condition. There is a marked absence of the more acute forms of insanity, the most prevalent form being an exaggeration of a low standard of intelligence passing rapidly into dementia; primary dementia is not uncommon; delusions and hallucinations are as a rule of very simple character; a belief in witchcraft is universal, and normal; it is often given after recovery as a cause of insanity, and must not be considered in itself as at all a sign of Melancholia is rare and never very acute. insanity. General paralysis of the insane is rarely if ever seen among Asiatics. Dr. Ellis had never seen a case; the general causes of this disease, anxiety, worries, excesses, are uncommon among Asiatics.

The female recovery rate is about 35 per cent., the male about 41 per cent.; only one case of puerperal insanity was met with in twelve years. There are many admissions from syphilitic insanity, and from insanity following malarial fever, which latter end in recovery. Neither opium smoking nor the subcutaneous use of morphia are regarded as causes of insanity.

The food question in an Eastern asylum is important, and refusal of food must not be looked upon as a sign of insanity without careful investigations, as, so long as a mere glimmering of sense be left, it may be a question of "caste" or religious prejudice. There is great difficulty in finding amusements for Asiatic patients.

Beri-beri is a frequent cause of mortality in the asylum.

Dr. Ellis dealt also with the subject of Amok, which he states is practically peculiar to the Malay race, and is a state of blind, spurious, homicidal mania. As exciting causes of the condition, fright,

grief, a severe illness, brooding over real or imaginary wrongs, the sight of blood, malarial fever, and a peculiar condition of nervous depression, have all been cited. The question of legal responsibility for the actions of the person seized by Amok is a perplexing one; but Dr. Ellis is inclined to believe that there are two varieties, one which is purely pathological, whilst in another form Amok is feigned more or less for the purpose of obtaining revenge.

Dr. Moffat (Uganda) remarked that it is a curious fact that in regard to nervous diseases among the natives in East Africa such affections as locomotor ataxy and general paralysis of the insane are extremely rare, although syphilis, which is generally supposed to bear an etiological relation to them, is common enough. Sexual excesses and intemperance are both rife, and yet, in spite of all this, nervous diseases generally are rare among the natives of East Africa. The Soudanese, Nubians and other tribes are especially addicted to running Amok. In their own words they ascribe it to "seeing the devil," and they always profess absolute ignorance of their actions after the fit has passed over.

Dr. Henderson said that in Shanghai the Chinese suffered from acute mania and from suicidal impulse.

# AN EPIDEMIC OF ZINC POISONING THROUGH DRINKING CONTAMINATED WATER IN THE TROPICS.

JOHN D. GIMLETTE, L.R.C.P., M.R.C.S., Residency Surgeon, Pahang, Federated Malay States, communicated a paper on this subject, in which he stated that this epidemic occurred during 1900, among a half-company of men of the Malay States guides (Sikhs and Pathans) stationed at Kuala Lipis, Pahang.

The men lived in barracks, built in 1898, and roofed with galvanised iron. In January, 1900, galvanised iron tanks were supplied, in order that water might be collected from the roofs of the buildings; the water supply had been obtained previously from a large

river in the neighbourhood.

In 1900 an unusually large number of men were attacked with gastro-intestinal troubles; from March to October, 1898, thirty men were treated for this class of disease; from March to October, 1899, there were fifty-eight such patients; but from March to October, 1900, the number rose to 219, and at the close of the year it was found that forty-three individuals out of the fifty-six men of the half company had suffered.

In October, Dr. Gimlette began to suspect some form of metallic poisoning, and after applying some rough tests which proved the presence of zinc in the water, he sent samples of it to the government analyst in Singapore, who reported acid carbonate of zinc in solution in large quantities, from 4.82 to 11.45 parts per million. White patches of adherent powder were common on the roofs; one of these from a gutter was examined and found to consist largely of zinc and carbon dioxide.

Discontinuance of the water was ordered, and the number of gastro-intestinal patients steadily decreased, only twenty-two cases (many of these being eld patients) having been treated from January until April, 1901.

The symptoms presented were those of colic, diar-

rhea with consequent anemia and emaciations, and a spurious kind of dysentery. A clinical account of six typical cases, with one death from exhaustion from long-continued diarrhea, is given in the paper.

In concluding, Dr. Gimlette asks the pertinent question as to whether it is not advisable that enquiry be made as to possible contamination of water in places in Australia and South Africa where water is collected from galvanised iron roofs, especially in regard to the prevalence of gastro-intestinal disease

in the latter country.

Mr. Cantlie drew attention to the suggested resemblance between beri-beri and many of the cases of arsenical poisoning from drinking adulterated beer in Manchester and elsewhere in England. The subject was mentioned in Major Ronald Ross's presidential address to the Section of Tropical Diseases, and it was being discussed at one or more of the several sectional meetings of the British Medical Association now being held. He thought that it would be expedient that an expression of opinion on the subject should be got from those present who had seen beriberi in China, the Straits Settlements or elsewhere.

Dr. Max. F. Simon, C.M.G. (Singapore) remarked that he did not think beri-beri could be traced to arsenic or any other metallic poisoning. There was nothing in common between the two complaints except neuritis. In beri-beri there were neither skin, eye nor digestive symptoms present to justify such a

conclusion.

Dr. Manson, C.M.G., F.R.S., expressed a similar opinion, but pointed out the great difficulty he had in diagnosing between beri-beri and alcoholic neuritis, when the patient suffering from the latter disease came from a country where beri-beri prevailed. Some definite clinical sign or symptom of beri-beri should be carefully and persistently sought for in order that a clear and precise diagnosis of the disease may be arrived at.

Dr. Edward Henderson, M.D., F.R.C.S.E., said he fully endorsed what Dr. Manson said about the difficulty which may arise in distinguishing a case of alcoholic neuritis from one of beri-beri, but cannot understand how such confusion can ever occur when the distinction has to be made between beri-beri and chronic arsenical poisoning. He had seen a large number of cases of beri-beri in China, but cannot remember ever having seen skin pigmentation as a symptom in any of them. He regards the theory of metallic poisoning as untenable.

#### FILARIAL ABSCESS.

Dr. J. Preston Maxwell, F.R.C.S. (China), contributed a paper on filarial abscess. In his practice in Southern China, he was at first struck with the frequent occurrence of abscess in connection with the scrotum, as compared with its occurrence in England.

In searching for a cause he was able to exclude tubercle, venereal and urinary affections, injury, and bites of insects, and on commencing to systematically examine the blood he found *Filaria sanguinis hominis nocturna* in all cases. Subsequently he found this filaria in cases of abscess in some other localities, such abscess being apparently the early manifestation of filarial disease. Such abscesses occur most frequently

in the scrotum, but may occur also in any situation where there is loose connective tissue rich in lymphatics; for this reason the majority, apart from those in the scrotum, are found in the vicinity of the large vessels, e.g., in the axilla, or in Scarpa's triangle or Hunter's canal.

In one case only portions of the body of a parent worm were found in the abscess; the death of the parent worm may be sometimes the cause of the abscess, but Dr. Maxwell is inclined to think that in many cases the cause may be connected in some way with the blocking of lymphatic vessels, especially as in several cases the abscess appears to be the first manifestation of elephantoid disease of scrotum or limb.

Filarial abscess may be thus classified:-

(a) Abscess of scrotum:

(1) Suppurating hydrocele; (2) abscess of the cord; (3) abscess below the testicle.

(b) Abscess of the limbs.

(c) Intra-abdominal or intra-thoracic abscess.

Clinical and diagnostic points in connection with these varieties of abscess are described in the paper, as also is the treatment, which consists in incision and drainage, the latter requiring sometimes, especially in cases of abscess of the cord and femoral abscess, careful attention.

Filarial abscess, if treated, ends in recovery so far as the condition itself is concerned, but it is liable to be followed by elephantoid trouble, of which, as has been said, it seems sometimes to be the first manifestation.

Three typical temperature charts accompanied the paper, and a list of twenty-three cases of the disease.

Dr. Manson said that abscesses occurred around dead parent filarial worms or they may be produced within an area of obstructed lymphatic tissue. Grave conditions result from abscess forming around dead filarial worms within the thorax or abdomen. He had seen a case in which the filarial embryo gradually disappeared from the blood, after a series of febrile attacks evidently the result of deep-seated inflammation in the abdomen. The febrile attacks were probably due to the disturbance caused by the death of a parent filaria among the abdominal lymphatics in front of the spine; and the lessening in numbers of parent worms brought about a corresponding decrease of numbers of their embryo in the blood. Manson believes that it would be possible to short circuit the passage of the lymph on its way to the veins. In a well-marked case of obstruction in, say, the thoracic duct, the lymph finding its way blocked causes a varicosity in the lymphatics below, enlargement of groin glands, and, passing to the superficial lymphatics, gets by collateral circulation onwards to the upper part of the body. Dr. Manson suggests that the blocked lymphatic channels could be made to open into the surface veins of the thigh by suturing the one vessel to the other, and thereby relieve the lymphatic circulation and allay the tendency to elephantiasis, &c.

Professor McWilliam (Aberdeen) saw no physiological objection to the lymph from a lymphatic in the groin being made to discharge its contents into

a vein.

#### SOME POINTS CONNECTED WITH HUMAN FILARIASIS.

Dr. J. EVERETT DUTTON, Liverpool School of Tropical Medicine, contributed a paper which dealt specially with the question of how the filariæ escape from the strong chitinous case of the labium of the mosquito into the blood of man.

Grassi and Noe believe that owing to the bending of the labium stuffed with filariæ, when the mosquito pierces the skin with its stylets, a rupture of the integuments at the bend takes place and allows the filarize to escape from the chitinous labium.

Dr. Dutton, however, believes he has found near the tip of the labium a roughly triangular region, bounded above by the stout band of chitin forming the upper surface of the labium, and in which the stylets rest, and on either side by the two lateral regions of the labium. This area is occupied by a very delicate loose membrane, covered with very fine hairs; it is easily torn, and is rather difficult to see under the microscope owing to its transparency. This region appears to be the weak spot in the chitinous exoskeleton of the labium, and in all probability it

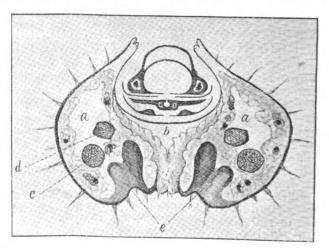


DIAGRAM SHOWING TRANSVERSE SECTION OF PROBOSCIS OF Anopheles Costalis at Labellar Joints.

- (a) Lateral pear-shaped end of main body of labium.

  (b) Triangular region. Above (b), chitinous surface of tip of labium; below, loose membrane.

  (c) Nerve to labella.

  (d) Tendon to labella.

  (e) Regions of labellar joints.

is through this weak spot that the filariæe escape whilst the mosquito bites. Manson has suggested that the young filariæ can apparently discriminate between flesh and vegetables; he states that mosquitoes affected with filariæ did not get rid of the parasites after many meals of bananas, but the worms could be seen coiled up in the proboscis. and Noe, however, state that a great quantity of anopheles, certainly infected within the labium on August 8th and submitted to a fruit diet, presented the labium on August 10th completely empty. It would therefore appear that the filariæ may occasionally pass from the proboscis into vegetable substance. As, however, it is very probable that the female mosquito lives on blood alone, there can be no great risk of the young filariæ being lost in a fruit diet.

### Original Article.

## A CASE OF GENERAL EXFOLIATIVE DERMATITIS.

By Staff-Surgeon P. W. Bassett-Smith, R.N., Haslar.

Courteously forwarded by the Director General, Medical

Department, Admiralty.

Cases of general exfoliative dermatitis, or pityriasis rubra, are of sufficiently rare occurrence to be placed on record, and though it can scarcely be called a tropical disease yet the onset of the present case, taking place while the man was serving in the Mediterranean, renders it the more suitable for this Lournel

In the very full account of this curious and often fatal skin affection, as described by Stephen Mackenzie in Allbutt's "System of Medicine," the most important characters are pointed out, with the great variations that are found; the present case falls in best with those originally described by Hebra as "pityriasis rubra," the great and general desquamation, the intense redness of the true skin, the albuminuria and the fatal termination. The term pityriasis is, however, not strictly appropriate, as the epidermis mostly came off in great scales or flakes, sometimes as large as the hand, they were often very thick, not at all "bran-like." It is also difficult to say whether the disease was primary or secondary, though at first described as appearing in small scattered psoriasislike patches on the trunk and extremities; these rapidly spread until the whole surface was implicated, that is taking six months to do so, death occurring after one year and ten months.

The most noticeable points were: (1) The ravenous appetite throughout; (2) the early and extensive arthritic complications with fever, leading to hyperflexion of most of the joints; (3) the large bed-sores; (4) the presence of albuminuria which disappeared shortly before death, when the urinary secretion became greatly diminished, accompanied by a semi-comatose, probably uræmic, condition, in the last week.

There was no marked history of syphilis, or alcoholism, the latter, according to Pringle, being

frequently found.

The post-mortem appearance is well shown in the photograph, it was found to be impossible to straighten the limbs even after division of the tendons; this was in great part due to the contraction of the skin and soft parts, but also to partial anyklosis of the joints themselves.

The true skin was found to be thickened and

intensely congested.

Microscopical examination of kidneys, showed much degeneration of the tubular epithelium, like that found in chronic parenchymatous nephritis, with marked distension of the vessels with blood and with small hæmorrhages scattered about, especially in the cortical substance.

For the careful notes here epitomised, I have to thank Surgeon W. L. Martin, R.N., and also Deputy Inspt. General Mahon, C.B., R.N., for permission to use them.

Mr. C., aged 22, Pt. R.M.L.I.

History.— While serving in the Mediterranean, about June, 1899, he had small and scattered patches

of psoriasis on the trunk and extremities; in January, 1900, the greater part of the body surface, scalp, face and limbs, were covered with extensive patches of psoriasis, the eruption then was noted as being remarkably scaly. Both shoulder joints and the right knee became tender and swollen; treated with salicylates and arsenic, also liq. carbonis detergens locally. In September, 1900, he was sent to Malta Hospital, being then very emaciated and debilitated, the whole body was covered with the eruption, the right knee joint was full of fluid, and there were general arthritic pains, and evening pyrexia. While there he is said to have improved and was invalided home, arriving at Haslar on December 1.

Condition on admission.— Very emaciated, unable to walk or even raise himself in bed without help, the whole skin surface covered by a scaly eruption; the flakes that came off were generally large and thin, the skin beneath being intensely red and shining; enormous numbers of flakes peeling off daily, filling a quart measure; the scalp and face were equally affected, some of the nails of fingers and toes had dropped off, others were thickened and variously distorted. Three bed sores were present, one over the sacrum, one over upper and one over lower dorsal The right and left knee joints were in a regions. state of hyperflexion, and were partially ankylosed. Right elbow in much the same condition. The lower limbs were slightly cedematous. The patient stated that he felt quite well; though intensely weak, his appetite was large and he was able to smoke; the urine was acid, clear, but contained a large amount of albumen.

On January 1 the urine had decreased in quantity; there was more cedema, desquamation profuse. Thyroid extract and hot baths were now tried.

On the 10th, owing to diarrhoa and no evidence of

improvement these were left off.

On 27th, there was marked bronchitis, and involuntary action of the bowels. More ædema.

February 4.—Urine reduced to 14 oz. Œdema now extending up the legs.

February 6.—Patient in a state of stupor. Urine 14 oz., but no albumen could be detected. He gradually became weaker and died on February 8, apparently from uræmia and heart failure.

Post mortem.—Great emaciation, hyperflexion of joints. Scalp and face: hair very thin, skin red, covered with small scales; skin generally of a diffuse red colour, neck like raw ham; very marked hypostatic congestion, considerable ædema of limbs. Lungs bronchitic. Heart hypertrophied, no valvular lesions; aorta atheromatous. Liver, spleen and kidneys markedly congested. Intestines also very injected.

PRESENTATION TO DR. PATRICK MANSON, C.M.G., F.R.S., LL.D.—At the meeting of the British Medical Association at Cheltenham, the President presented Dr. Manson with the Stewart Prize. The award consisted of an illuminated scroll and a cheque for £50. The prize is given for the encouragement of the study of epidemic diseases, and it has never, in our opinion, been bestowed on anyone who more richly deserved the compliment. We congratulate Dr. Manson.

### Business Motices.

1.—The address of the JOURNAL OF TROPICAL MEDICINE is Messrs. Bale, Sons & Danielsson, Ltd., 83-89, Great Titchfield Street, London, W.

2.-All literary communications should be addressed to the Editors.

3.-All business communications and payments should be sent to P. Falcke, Secretary to the JOURNAL OF TROPICAL MEDI-CINE. Cheques to be crossed London and South Western Bank, Great Portland Street Branch, London, W.
4.—The Subscription, which is Eighteen Shillings per annum,

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## Journal of Tropical Medicine

August 15, 1901.

#### CHELTENHAM.

The Meeting of the British Medical Association, at Cheltenham, was an unqualified success in every way. The attendance at the sections was good, the subjects discussed were in many instances very interesting, and the social and other arrangements were highly creditable to the local committees.

What, perhaps, was the most striking and in the majority of instances a surprising feature to the assemblage at Cheltenham, was Cheltenham itself. In our text-books in medicine and therapeutics we are accustomed to see the place prominently referred to as a watering place of importance. Careful analyses also are given of the composition of the various waters which give Cheltenham its reputed pre-eminence as a resort for invalids, and the waters of the Spa are commended specifically for several ailments.

What we were not prepared for on going to Cheltenham was to find that it was not a resort for invalids at all, or only to an infinitesimal The medical men there state that extent. patients are sent to them occasionally from many parts of the world in the belief that the Spa is in full swing, and that treatment by drinking the impregnated waters, baths, &c., is a matter of routine. Unfortunately there is no systematic régime of the kind available. As a watering place, Cheltenham has fallen behind in the race, it is neglected and passed by, and this too, for no reason evident to the visitor. The waters are as potent and as plentiful as ever; they are calculated to relieve the ravages of gout and hepatic ailments, and the troubles that are grouped together as being due to residence in hot climates. A glance at the composition and character of the waters will serve to indicate the diseases in which they are likely to prove useful.

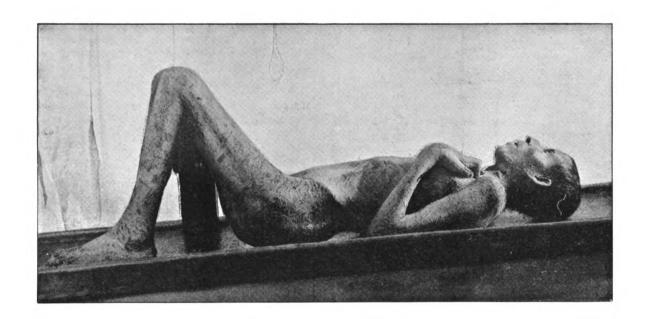
The mineral waters, which are none of them thermal, may be classified in three groups.

- (1) Magnesia-saline group, represented by the Chadnor Villa and Cottage Wells, which contain, in addition to sodium sulphate and chloride, considerable quantities of magnesium sulphate. These aperient waters promise to prove suitable for drinking purposes in the class of cases in which benefit is derived from the Carlsbad course.
- (2) Soda saline waters, in which chloride and sulphate are the chief ingredients. Of these, the springs known as Pittville I., II., and III., are the most important sources, and it is proposed to utilise the springs I. and III. for the supply of baths.
- (3) Chalybeate waters, of which the Cambray chalybeate is the chief representative.

The Cambray chalybeate contains iron in the form of carbonate, and deposits a red sediment of oxide on standing.

When we turn to the appearance of the city and its environments, the stranger to Cheltenham is surprised indeed. It is undoubtedly one of the most beautiful towns in Britain, and compares favourably with any of the watering places on the Continent in attractiveness.

Cheltenham has been named the "garden city,"





Photographs illustrating the article on Exfoliative Dermatitis, or Pityriasis rubra.

By Staff-Surgeon P. W. BASSETT-SMITH, R.N., Haslar.

-30 4 4.,

and well it deserves the title. The principal streets are adorned by well-grown trees, sometimes, as in the wide promenades through the centre of the town, in four rows; chestnuts and limes prevail, and their ample foliage afforded very grateful shade during the hot weather that was experienced during the "Association week." Public and private gardens abound, with the result that the area covered by the city is of great extent; so much so that in place of the 50,000 inhabitants—the present population of Cheltenham—three times that number might find ample space were the streets laid out as in most other cities.

The Pittville Gardens, the resort of those who came for "the cure" in days gone by, are surely a masterpiece of the gardener's art. It is here, also, that the pump-room is situated, an excellent piece of masonry set in a beautiful surrounding. The building, with its vaulted roof, Corinthian pillars, and general appearance, reminding one of a Greek temple.

Other public gardens of great beauty there are in plenty, and yet, with all that nature and art can do to attract, Cheltenham has lost the place which belonged to it some seventy years ago.

One naturally asks, why? It is not that the waters have lost their power to "cure"; it is not that the city has declined in beauty, for time has but served to enhance the quality of the lawns, the foliage of the trees, and the general attractiveness; it cannot be that the country around is less featureless, for the Cotswold Hills remain, and every acre of ground almost in this neighbourhood is pregnant with historical interest.

It is fashion that has changed. When to reach Cheltenham was considered a journey, its waters were considered highly efficient and the beauties of the place were lauded. When, however, steam came in and shortened distance, the Continental Spas became fashionable and "home" resorts were neglected.

Other explanations are offered, namely, that a section of the townspeople do not want to see the place crowded with invalids. The development of schools also is another reason assigned for the want of enterprise in attracting invalids, for Cheltenham has become a great centre of education. There is, of course, the Cheltenham Public School, but besides this, and of more recent growth, is the Ladies' College, a seminary of leviathan proportions, and many other public and private schools of considerable pretensions.

These are some of the explanations given for the decline and fall of Cheltenham as a health resort. It is said, and we believe with some reason, that all this is to be changed, that an endeavour is to be made to restore Cheltenham to its proper place amongst British Spas. We wish the pioneers of this movement every success, and that speedily. We are confident that all the members of the British Medical Association who were made acquainted with the possibilities of Cheltenham will enthusiastically favour its advancement. Cheltenham is so centrally placed, so near the great centres of population, so attractive in every way, that we should be glad to see a recrudescence in its prestige as a resort, and for the sake of the many invalids to whom the long journey to a more distant home or Continental watering place is dangerous or impossible.

## LECTURES AT LAGOS ON "HEALTH" IN THE TROPICS.

At the suggestion of His Excellency Sir Wm. Macgregor, a course of ten lectures on "Health" have been delivered free to the community in Lagos, West Africa. Especially was it desired that sanitary inspectors, hospital nurses, and teachers in the Government schools should attend these lectures. At the completion of the course an examination was held and certificates distributed entitling the students to teach a "Health" class in the public schools of Lagos.

The wisdom of this step, the enlightened policy that initiated so useful a programme, and the great possibilities likely to ensue from the course of instruction, cannot be too highly commended and admired. We hope the example set in Lagos by Sir Wm. Macgregor will be followed in every colony and protectorate throughout the Empire.

We should like to publish the course delivered by Dr. W. H. G. H. Best, Resident Medical Officer, Lagos, and Dr. T. E. Rice, Assistant Colonial Surgeon, Ibadan, in full, did only space permit. As others may wish to imitate the example, we append the syllabus of instruction, and give the introductory and the third lectures as types of the course.

#### LECTURE I.

Introduction—Scope of Course—The Importance and Prevalence of Malarial Fever in Lagos—Co-operation of the People necessary—The Necessity of Teaching the Outlines of the Subject to Children at School.

#### LECTURE II.

Nature of Malarial Fever—A Malady exclusively Human—A Disease given by Mosquitoes to Man—How Communicated from Man to Man—Growth of the Parasite in the Mosquito.

#### LECTURE III.

Mosquitoes, their Eggs, Larvæ, &c.—Effects of Winds on Mosquitoes—Effects of Light.

#### LECTURE IV.

Water in the Propagation of the Mosquito—Water indispensable to Egg and Larva—Running, Still, Fresh, and Brackish Water—Aquatic Plants, Clean and Dirty Water—Clay Holes, Swamps, Pools, Flower Pots and Gardens—Reclamation, Drainage—Petroleum.

#### LECTURE V.

Water for Domestic Purposes—Water Barrel, or Tin
—Water Tanks—Wells—Rainwater—Drought.

#### LECTURE VI.

Insecticides—Solutions — Powders — Gases — Plants —Leaves of Trees—Smoke.

#### LECTURE VII.

The Mosquito Net—Isolation of Fever Patients— Special Care of Children—Administration of Quinine—Search for Mosquitoes.

#### LECTURE VIII.

Dysentery—Mortality from—How it is spread—To Preserve Water from Pollution—Disposal of Dysenteric Stools—Boiling and Filtering of Water—Water from Clay Pits Dangerous.

#### LECTURE IX.

Rainwater and its Advantages—How to Collect and Store it—Advent and First Symptoms of Dysentery—Steps to take on behalf of Patients— Necessity of Cleanliness on behalf of Others.

#### LECTURE X.

The Cause, Prevention, and Treatment of Malaria—Geographical Distribution—Influence of Heat and Cold and of Season—Influence of Local Conditions—Moisture—Influence of Rainfall, Winds, Trees, and of Soil—Prevention.

We here append the Introductory Lecture and the Third Lecture as examples of how such subjects may be dealt with so as to instruct the public.

#### LECTURE I.

#### Introduction.

It is at the suggestion of His Excellency Sir William MacGregor that a course of ten Lectures on "Health" with illustrations will be given gratuitously, and it is His Excellency's wish that sanitary inspectors, hospital nurses, and teachers in the Government Schools must attend and pass the examinations, else they will be unfitted for their posts.

At the end of the course the students will undergo examination. Those that pass the examinations successfully would receive a certificate stating that they have attended the Lectures and are qualified to teach a class of "Health" in the public schools of Lagos.

The certificated teachers would teach to their own classes the substance of the lectures delivered to

them in this course.

The scholars would be examined in the "Health" class as in any other, and marks would be allowed on a scale to be determined by the Board of Education. The teaching of "Health" would count to the teacher the same as other teaching and on a scale to be determined by the Board.

Special prizes may be offered to both teachers and

scholars.

#### Scope of the Course.

The objects of this course are to convey to its students a general acquaintance of matters connected with "Health," but we shall more particularly consider two of the diseases that are of most frequent occurrence in Lagos, viz., fever and dysentery.

Malarial fever is the principal fever here.

Malaria used to flourish at one time in England. The following extract from Graham's "Social Life of Scotland" in the eighteenth century shows what an important part it played in the life of the Scottish peasants:—

"The one ailment to which they were most liable and in which dirt had no share was ague (fever). This was due to the undrained land, which retained wet like a sponge, and was full of swamps, bogs, and morasses in which 'green grew the rushes.' Terribly prevalent and harassing this malady proved to the rural classes, for every year a vast proportion of the people were prostrated by it, so that it was extremely difficult to get the necessary work of the fields performed in many districts. In localities like the 'Carse of Gowrie,' which in those days abounded in morasses and deep pools, amongst whose rushes the lapwings had their haunts, the whole population was every year stricken more or less with the trouble, until the days came when drainage dried the soil and ague and lapwings disappeared."

In England King James I. died of ague near London, and the great Cromwell succumbed at Whitehall also to fever in 1658, a year in which malaria was widely spread and also very deadly. It is only within recent memory that the Fen districts in England, the marshy districts of Kent and Somerset have lost their evil reputation for malarial fever; by the improved sanitation and drainage, and the taking of quinine, all this has disappeared, and at present malaria appears to be unknown in

England.

In the German army in the year 1869, 13,563 cases occurred, in 1897 only 230 cases when quinine was used.

The Importance and Prevalence of Malarial Fever in Lagos.

It has been said that half of the mortality of the human race is due to malaria. This may very well be an exaggeration, but there can be little doubt that of all the ills that flesh is heir to malaria is the most deadly, and exercises the most profound influence on the distribution and activities of man. It is by far the most important disease in the tropics. Not only does it give rise to grave and sometimes fatal fevers, but in consequence of its prevalence and its weakening influences, it undermines the health of millions, making them an easy prey to other diseases, which it complicates and makes worse, and otherwise unfitting them for the active business and enjoyment of life. Directly and indirectly it is the principal cause of sickness and death in the tropics. More than one-fourth of all deaths in Lagos are caused by it.

Malarial fever when it does not kill leaves great weakness behind, and all who have watched malarial patients or patients who are already recovering from an attack cannot fail to have noticed the carelessness and want of interest in their surroundings, and the lack of wish to work that they show. Apart from the direct mortality, the disease probably levies a heavier toll on the capacity of the general inhabitants, the officers, employés, and others who build up and administer the British Empire than

does any other single agency.

Malarial fever is now known to be curable; therefore, as soon as malaria is recognised, unless there be some very good reason to the contrary, your first duty is to give quinine. There are many ways of giving this drug. However given, care must be taken that it is given in such a way that there can be no mistake about its being taken up into the body, as the food or water we eat and drink. If the patient for any reason, such as inability to swallow or persistent vomiting, cannot take it by the mouth, then it must be given by the rectum in the form of an injection, but if the circumstances of the case are such that a rapid action of the drug is required,

then it may be injected under the skin.

Co-operation of the people necessary.—The inhabitants of malarious districts ought to live in towns or villages, well built houses, broad open streets, well drained. The houses, if possible, should be placed on high and dry situations and raised above the ground; it is unwise to place dwellinghouses in exposed situations where high winds are apt to produce chills and consequent fever relapses. For the same reason in elevated situations houses should be well sheltered by trees planted at some distance from the premises, or by higher ground. The grass should be left undisturbed around the houses and kept cut regularly; all exposed soil should be covered with rammed earth. It is most unwise to have flower beds or vegetable gardens near bedroom windows, or to allow water from bath room or cook houses to flow over the ground near the house, or to keep water unchanged in tub or water butts for mosquitoes to breed in. Pools and puddles of stagnant water should be filled up and rammed down with earth and grass planted. The neighbourhood of swamps is to be avoided. There is a fish in Lagos called "Ojiji" which should be cultivated and placed in ponds, and in the pots where your water is stored, as it keeps down mosquitoes by eating up their larvæ, those little wriggling brown creatures so commonly seen in the pools of water, and which wriggle to the bottom when disturbed;

mosquitoes grow from these little creatures. Broken glass bottles should not be placed upon walls, nor broken calabashes, pots, cocoanuts, left lying about, as water collects in them and mosquitoes breed. All pots and pans containing water should be regularly turned out once a week and puddles should be brushed out. The larva takes some seven days to develope, so that once a week suffices to destroy each brood. All useless water should be drained away and stagnant ponds filled up.

One of the simplest ways to destroy the larvæ of the mosquitoes and to prevent them depositing their eggs on the surface of water is kerosene oil. A piece of rag tied to a stick should be dipped into the oil and then applied to the surface of the water. The oil spreads out like a fine skin over the surface, and entering the breathing tubes of the larva it dies suffocated and choked. Fresh tar has the same effect. This "painting" of the water must be renewed once a week. Wells and tanks should be kept closed.

A more careful selection of the site for houses and a liberal use of wire mosquito-proof netting for shutters will do much to lessen the risk of malaria. Walls of rooms should be painted white to make easy the discovery of mosquitoes. Beds should be provided with fine muslin mosquito nets.

As those suffering from malarial fever are dangerous to their companions because they give them fever, they should as far as practicable be avoided and compelled to use efficient mosquito nets.

Quinine to be taken, as the parasite is very easily killed by it, owing to its poisonous action, and this is especially the case at the time when the seeds of the parasites are forming and are being set free in the blood.

The necessity of teaching the outlines of the subject to children at school, so that they may obtain a mastery of the subject, know one family of mosquito from another, and understand the relation between fever and mosquitoes. It is said that 57 per cent. of children up to 8 years of age and 28 per cent. of children up to 12 years are thoroughly full of the parasites, and hence highly dangerous to their neighbours. If these can be taught to use mosquito nets and take quinine in their early days, much will be done towards reducing the number of infected mosquitoes and consequently malaria.

At the suggestion of His Excellency the Governor, a "Ladies' League" has been formed in Lagos, the principal function of which is to administer quinine

to young children.

The many difficulties and the great responsibilities of the members of the League are fully recognised, but there is every assurance that these difficulties will be met with wisdom, and the responsibilities undertaken with a conscientious desire for the good of all classes.

How this can best be done.

It should form the subject of teaching in all the public schools of Lagos, and to encourage them special prizes might be given in the malaria class.

#### LECTURE III.

Mosquitoes and Malaria.

The word mosquito means a "little fly." It is used popularly to denote a gnat which bites; and

most gnats bite when they have a chance. There are about 250 species of mosquitoes.

The mosquito is the carrier of the germ of malaria, and rises from pools of water from the

This mosquito-malarial theory was first formulated by Dr. Manson. For two and a half years Major Ross dissected mosquitoes looking for traces of malaria and finding none, but at last he found what he sought in a species of mosquito called Anopheles, the mosquito with the spotted wings and boat-shaped eggs; and only the species of this family, so far as we know, are capable of conveying the infection from man to man. In their bodies only will the germ develope, and the mosquito acquires the germ by sucking the blood of an infected man. It is of practical importance, therefore, to be able to recognise, if not the species, at least the family to which any given mosquito belongs.

The adult mosquito may live for months. They feed on fruits, birds, animals, as well as on man, but only the female sucks blood, the males living on fruits and leaves. They are, however, very fond of wine, and may be seen staggering about in the most ridiculous way—evidently drunk. After feeding on man the female generally sleeps, gorged, all day on the wall of a room or other dark place. Every few days she flies back to the water where she was bred, and where she lived as a larva, or else to some other suitable spot; she lays her eggs, and then returns again, probably to the same place where she first fed. Hence mosquitoes which feed on man generally breed in water near houses.

There are two great families of mosquitoes. (1) The Culex family, and (2) the Anopheles family.

Culex do not carry the malaria germ. Culex have short palpi, they breed in almost every vessel of water, empty calabashes, flower pots, tubs, &c., in which rain-water collects.

The eggs are laid on the surface of the water; they form tiny boat-shaped masses, about 200 to 400 eggs in each batch, which float on the water like specks of soot. From each egg a little larva is born. They are laid in the early morning and are hatched out in about sixteen hours.

Larvæ live and grow in water and become nymphæ in about seven days. They are very active little creatures, feed greedily on any animal matter. They come to the surface of the water with a series of jerks and wrigglings of the tail, to breathe with head hanging vertically down; the air-tube terminating at the tail extremity in a long breathing tube causes this attitude. When disturbed they sink rapidly to the bottom of the water. They are larger than those of Anopheles, and have a prolongation at the tail, and live in pots, drains, tanks, and swamps, &c.

Nympha differs most pronouncedly from the larva in the great swelling of the chest parts. It is lighter than water, and remains motionless at the surface, but when disturbed wriggles to the bottom with difficulty, when it ceases to exert itself it gradually floats up to the surface. It floats with its head upwards, and after two days the mature insect steps out of the floating skin that the nympha lived in.

#### Mature Insect.

The male has long palpi nearly as long as the proboscis, with five segments; the female has very small palpi with three segments; the wings are unspotted. When at rest on a plain surface it assumes a position more or less with the axis of its body parallel to the surface. The short palpi of the female Culex distinguishes it from the female Anopheles. Its attitude is angular, humpbacked.

Anopheles.—The malarial-carrying mosquito with long palpi and spotted wings. It bites at sunset and sunrise, probably also during the night, and breeds chiefly in small pools of water on the ground containing green water-weeds. It is a rather large mosquito and is very bloodthirsty. The eggs are laid in natural collections of water in lots of 40 to 100 floating close to each other, e.g., stagnant pools and ponds, small sluggish streams which are free from fish, and which preferably contain green weeds. They are generally arranged in loosely connected masses of three or four and attach themselves to weeds, sticks, leaves, &c. In three days they develope into larvæ.

Larvæ live in pools of water containing green weeds which they feed upon. They are very active, wriggling little creatures, and come to the surface of the water to breathe with the body lying parallel to the surface and immediately below the surface film, so that portions of its head as well as its breathing tube are out of the water. The air-tubes terminate near the tail end without any breathing tube, so they have no prolongation at the tail. When disturbed they glide away tail first, close to the surface of the water, with a skating kind of movement, lashing their tails sideways. They are smaller than those of the Culex and live in pools or ponds with green water-weed, upon which they feed. In about sixteen days they develope into the nymphæ, and they develope into the mature insect five days later.

#### Mature Insect.

Both male and female insect have long palpi; each palpus has five segments. They have spotted wings. When at rest on a plain surface, it assumes a position more or less at right angles to the surface; it is all in one line. It is only the female that sucks blood.

The Anopheles, as it is readily infected by the human parasite, is therefore well worth studying. Its boat-shaped eggs give rise to charming little larvæ whose diet of minute algæ gives a greenish tinge to the centre of the body which elsewhere is of a brownish colour.

When at rest these small larvæ float on the water, parallel with the surface, and not hanging down as does the larvæ of the Culex. They have a most beautiful arrangement of minute hairs arranged like the ribs of an umbrella turned inside out along the upper surface of their backs, and by the action of these hairs they hang on to the surface film of the water. Their breathing organs open near the tail but are not produced into the long breathing tube by which the Culex larvæ can be so easily recognised. They possess the most marvellous arrangement on the head for setting up currents conveying food to the mouth, and in fact they afford one of the most

charming objects of "animated nature" that one could desire to watch. After some days, varying according to the temperature, the larva turns into one of those curious active winged nympha. The nympha floats on the surface of the water, and when mature the skin splits along the back, then the perfect insect steps out, rests a moment to dry its wings, and sails away into the air.

The Anopheles, unlike the Culex, which breeds close to houses in tanks, drains, &c., prefers rain-water puddles, natural hollows by the wayside, small ponds, and in shallow water easily heated by the sun's rays where green water-weeds abound, such as small run-

ning streams.

During the day they always choose the darkest places to rest, and sit in a highly characteristic attitude, their bodies being held almost at a right angle to the wall. They are usually to be found in the darkest corners, not infrequently beneath tables, chairs, behind pictures or hats on the wall, and on the darkest parts of painted walls, and unless disturbed they do not as a rule bite except at night.

#### Effects of Wind on Mosquitoes.

The frail mosquitoes do not resist the wind, there fore when it blows they remain in their hidingplaces, clinging to branches of trees and grasses, sheltered by the close-clustered foliage, and do not come out, nor do they attack man at sunset, but when the wind subsides they swarm out in flights. It is possible that light winds may cause mosquitoes to spread, but as a rule they tend to diminish their number in the air. They have been known to travel fifteen miles. The hours in which mosquitoes are to be found most plentifully are in the evening and night; by day they live hidden away and sheltered, but when the wind blows they do not come out of their hiding places. They do not wander from the place where they are born, and especially they fly at little distance from the ground. They have, however, been found to visit ships in the harbours, and this explains how malaria fever breaks out after a ship that has visited malarial ports has gone out to sea. It is said that with light winds they can travel three miles, so that they can easily cross the Lagos lagoon, and by flying obliquely upwards can attain a height of 1,000 feet. Some mosquitoes have been found at very high altitudes; His Excellency the Governor has seen them very bad at 6,000 feet, and also at 10,000 feet up mountains, so you see altitudes alone cannot be taken as a guide to safety from fever. At Sierra Leone, for instance, Wilberforce Village is 700 feet high, but malaria and Anopheles are very plentiful there.

Shady damp woods and trees in general are the nests of mosquitoes. The mosquito besides being a source is consequently also the carrier of malarial infection. Woods do not, as was once said, filter malarial germs. Mosquitoes rest in trees, and trees help to drain the soil, and so prevent pools forming

wherein mosquitoes might breed.

#### Effects of Light.

Mosquitoes do not like the light, therefore they hide in the daytime, choosing the darkest spots, clumps of trees, &c., and come out at night to feed,

but on dull days they will bite during the day or among trees where there is shade.

Mosquitoes may be carried long distances by railway trains. The railway carriages often contain hundreds of mosquitoes, and in this way unlimited numbers of mosquitoes are carried to great distances; they emerge from the cars and start to breed, so that regions where mosquitoes are ordinarily rare may become infected by them, and in this manner malaria spreads.

## THE NEW HOSPITAL FOR THE CURE OF TUBERCULOSIS IN TENERIFFE.

By Dr. Stanford Harris. Las Palmas, Grand Canary.

The treatment of tuberculosis, which has now become associated in the English mind with the expression "Nordrach treatment" (from the fact that the Nordrach Sanatorium is the best known to the British public) has for its successful working a hundred or more details, but the essentials can be given in a few words. They are: A continuous supply of pure air, overfeeding, rest (complete while there is any fever), graduated exercise, absence of all injurious surroundings, such as one meets with in the recreation rooms of an ordinary hotel.

This treatment, be it good or bad, is about to be tried by the almost unanimous verdict of the laity and faculty. It is, moreover, founded on a scientific truth. There are very few diseases which drugs alone can cure, and consumption is certainly not one of these. It is now fairly well known to the public that the blood has within it the necessary material for combating and destroying an ordinary dose of most diseases. If the dose be large, the victim old or in bad health, the disease conquers and the patient dies. It is often the duty of the physician to simply watch Nature cure, keeping guard, meanwhile, to see that nothing that Nature is calling for should be wanting, or that anything which would fight on the side of disease should be permitted in the neighbourhood of the sufferer. This is the essence of the so-called Nordrach treatment. The medical director of the new hospital for tuberculosis in Güimar, Teneriffe, is endeavouring to introduce into the details of the treatment there the good points from each of the now existing sanatoria of Europe, and in some particulars to go one better, as, for example, the abolition of reception rooms.

The advantages which he claims for Güimar are best explained by quoting from a letter written by him, which appeared in the *British Medical Journal*,

July 15:- "CLIMATE AND THE CURE OF CONSUMPTION.

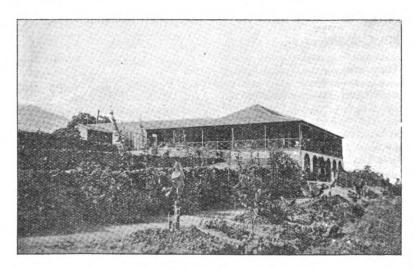
"SIR,—For many years past the Canary Isles and Madeira have been the resort of tuberculous patients, and, with few exceptions, the effect of the climate has been only to keep the patients alive, it has not cured them.

"Now, therefore, there is a reaction in the minds of medical men and the public generally against sunny climates, and almost all sufferers from phthisis are advised to 'stay in their own country and to be treated in suitable sanatoria.' "The object of this short paper is to suggest that if suitable hospitals were to be built in such climates as we enjoy in the Canary Islands, then, but not till then, these resorts would be superior for the treatment of consumption to such climates as those of England, Belgium, Germany, and even France, where the variations in temperature are so great and the number of cloudy days so many.

"Up to the present time patients have been treated in hotels, where the hours kept and the amusements offered are directly contraindicated in the proper management of the disease. It is proposed shortly to erect a hospital in Teneriffe, where the inmates would be treated in every detail on the Nordrach principle. They would sleep in rooms built for the purpose, and spend their days on verandahs, lying in the sunlight and fresh mountain air. They would regulate their day and night in accordance with the days and nights of this subtropical land, that is to say, they would breakfast

Güimar is undoubtedly the fruit garden of Teneriffe, and has a climate which, for the treatment of chest disease, is unique. I feel sure that in the great yearly rush of health-seekers to the Canary Islands, the valley of Güimar will in the near future become one of the most favoured resorts.'

"In conclusion, it may be well to give a few instances of the value of breezy mountain air as opposed to the relaxing air at the sea-level, such cases being personally known to me. In passing, it may be permissible to say in answer to the statement sometimes made, that the resorts now in use at the sea-level, such as Las Palmas, are actually unhealthy, that during the four years in which I have been resident in the town of Las Palmas, I have not had occasion to sign a single death certificate for anyone resident in the English hotel in the town. In the Spanish hotel I have had one death from tuberculosis, and in the English hospital in the Port one.



VIEW FROM THE HOSPITAL GROUNDS AT GÜIMAR.

at 7.30 or even earlier, and retire for the night at 6 or 7. The proposed building will have no reception rooms whatever, the patients taking all their meals on their verandahs. When convalescent they would be allowed walks and drives, and finally be passed on to an hotel close by where there are such amusements as billiards, lawn tennis, &c.

"After nearly four years' residence in the Canaries, I have come to the conclusion that the two most suitable spots for hospitals such as I have briefly indicated are Monte in Grand Canary, and Güimar in Teneriffe. The first venture will be made in Güimar. Dr. Wharry, of London, writing on Güimar, says:—

"'The Marquesa's house (El Buen Retiro), where accommodation has now been provided for a small number of English visitors, is prettily situated at an elevation of 1,200 feet above the sea. It has a very lovely shady garden, in which mangoes, custard-apples, oranges, pomegranates, and apples flourish as they do nowhere on the northern side.

"'A., now in Monte, has a normal temperature when in the mountains, but 103 to 105 degrees when in Las Palmas.

"B. has normal temperature, no hæmorrhage, and increases in weight while at Monte. Whenever he returns to Las Palmas he has high temperature and some hæmorrhage; this occurs if he stays but two days at the sea-level.

"'C. has high fever at the sea-level, normal temperature in the hills."

"These cases could be multiplied indefinitely. In fact, the only cases which seem to require the lower level are the hopeless ones, and of course in their case this is only a palliative.

#### BERI-BERI ON BOARD SHIP. IS BERI-BERI DUE TO CARBONIC ACID POISONING?

By Albert S. Ashmead, M.D., New York.

In two letters which we publish Dr. Ashmead's views on the etiology of Beri-beri are enunciated.

#### LETTER I.

To the Editor of the "New York Times."

Will you permit me to observe regarding your notice of beri-beri on the schooner Alert that I have analysed the situation of several beri-beri ships, in respect to the cause, and I have always found some source where the poison of carbonic acid gas came from plentifully. I maintain, even against the Dutch East Indian doctors (beri-beri specialists of Java), that in all these outbreaks on ships it is some emanation of carbonic poisons which lies at the bottom of the trouble. The food has nothing to do with it. Beri-beri means "goat's gait" or "sheep's run," and it has reference to the symptoms of paresis of the nerves of the legs, always symmetrical; the dropping of the toes, or pes equinus; and the laboured lifting of the leg and thrusting it forward, due, in my opinion, to carbonic poisoning of red blood corpuscles and peripheral nerves. The quick recovery of all crews as soon as they are removed from the ships to a purer atmosphere is the same effect which the Japanese obtain by removing their sick from the low-situated wards of Tokio to higher ground. They thus obtain for them an increased supply of oxygen. Carbonic acid gas being heavier than air, sinks to the lowest levels, where, in Japan and the East, are always found the worst type of the disease.

In my special inquiry into diet as a cause, the captains of ships have told me that the food throughout the voyage, of those who escaped and those attacked, was identical. found, too, that worm-eaten rice of ships could not have produced beri-beri, otherwise all the negroes of the Savannah delta, upon whom the damaged rice is usually bestowed, would be permanent prey to beri-beri.

Beri-beri is not contagious, so that there is no need of disinfection. If the deficiency of hæmoglobin of the blood (there is never deficiency of red blood corpuscles in beri-beri) was due to a micro-organism, as some beri-beri specialists claim, why is not the spleen enlarged? And why are children and women in Japan so seldom affected? Nearly always men, and very robust ones, are affected with beri-beri.

Dr. Takaki's Japanese theory that rice produces beri-beri does not hold water. All that rice may have to do with it is that it represents insufficiency of alimentation. might as well incriminate the oatmeal when, as it so often

happens, beri-beri breaks out in a Scotch crew.

#### LETTER II.

To the Editor of the "Evening Telegram."

The disease beri-beri, reported as having attacked three of the crew on a Nova Scotian schooner which arrived to-day from Lagos, West Coast of Africa, by way of St. Martins, is the same disease that attacked the crew on the Robert S. Patterson, from Navassa Island, in 1894. investigated that case with the Japanese physician, Dr.

The ship had left Navassa fourteen days before her arrival at Perth Amboy, N. J. While loading phosphate earth as cargo seventy-four negroes begged Captain Barton to bring them home. Some of them had been there for a year. Sickness developed on the trip and three died and were buried at sea. A fourth died off Sandy Hook. An analysis of the phosphate earth of Navassa showed 3.98 per cent. of carbonic acid out of 100 component parts of bone phosphate of lime. The earth's composition was fifty-five grains silician matter, forty-five grains soluble matter, three-quarter per cent. carbonate lime, and really a deposit of coral or sea shells, or coprolite insects of sea decay

On visiting the Robert S. Patterson at Perth Amboy I found one man lying dead, two others dying, and ten others in various stages of beri-beri (kakke) as I had known it in

Japan.

These seventy-five men, who had worked in the phosphate quarries, had been shipped in a space less than five feet high, thirty feet wide and fifty feet long. This space had no port holes. Even a considerable part of space was filled with phosphate earth or cargo. In a space of 7,500 cubic feet seventy-five men lived thirteen days with the least possible ventilation, with four lanterns consuming part of the oxygen necessary for life, with all the foulness engendered by breathing, &c. These men were very poorly clad, and coming from many hardships suffered in a tropical clime, were so apathetic that nothing could induce them to go on deck for fresh air. It was evident in that case, and it is probably true also of the Nova Scotia schooner Alert, that carbonic poison was the cause of illness. Beri-beri is not the "sleeping sickness" of Africa.

The following query is appended to these letters by Dr. Ashmead: "If the Manchester (England) cases of beri-beri were caused by arsenical (beer) poisoning, why are not all cases of beri-beri due to some chemical poison?"

### Rews and Notes.

THE FIRST EGYPTIAN CONGRESS OF MEDICINE.—The first Egyptian Congress of Medicine, under the distinguished patronage of His Excellency the Khedive, will be held at Cairo in December, 1902. The papers to be read and discussed at this important meeting will be principally in reference to the diseases peculiar to Egypt. A number of well-known medical men will contribute reports and send communications, a brief summary of which is here

appended:

Hepatic Abscess (Drs. Cartoulis, Voronoff, Colloridi, Comanos Pacha, and Legrand); Alcoholism and its Advance in Egypt (Dr. de Becker); Anchylostomum Duodenale (Drs. Sandwith, Loos, and Ruffer); Bilharzia Hamatobia (Drs. Milton, Morrison, Goebel, Colloridi and Trekaki); Cordiopathia in Egypt (Dr. de Semo); Dysentery (Drs. Cartoulis and Hess Bey); Epidemics in Egypt, their Prophylaxis, and the Means for combating them (Drs. Bitter, Engel Bey, and Crendiropoulo); Bilious Fever (Dr. Valassopoulo); Malarial Fevers (Drs. Dreyer and Fornario); Filariasis in Egypt (Dr. Madden); Haschisch Insanity (Dr. Warnock); Conjunctival Granulations in Egypt (Drs. Eloui Bey, Sameh Bey, and Lakah); Prevalence and Treatment of Hydrocele in Egypt (Dr. Colloridi); Medicine amongst the Arabs (Dr. Eid); Myxædema in Egypt (Dr. Brossard); Ophthalmia in Egypt (Drs. Demetriades, Voilas, and Sameh Bey); Plague (Dr. Gotschlich); Tuberculosis in Egypt (Drs. Ibrahim Pacha, Hassan, Eid, and Sandwith).

There is no doubt that the scientific and practical importance of this, the first Medical Congress of Egypt, will arrest the attention of medical men in all quarters of the globe. The attendance and cooperation of all those interested in tropical and subtropical medicine is cordially invited by the

promoters of this enterprise.

We hope later on to be in a position to publish in our columns some of the papers read at this important meeting, and take this opportunity of wishing it every success, a wish in which we feel our colleagues will join.

#### FOR DIAGNOSIS.

#### A NEW DISEASE IN INDIA.

We have had forwarded for our opinion a description of a disease which we will leave our readers to express themselves upon. We have not obtained permission to publish the name of the writer of the letter sent to us, but we hope he will give us it in due

"My object in addressing you is to ascertain the name, pathology and treatment of a certain new disease which has lately made its appearance in some parts of East Bengal.

The brief symptoms of this new disease are that it attacks the patient with a burning sensation in the soles of the feet, followed by a swelling and burning of the skin thereof, and finally the skin covering the feet becomes hard as wood. Gradually, as the disease advances the whole surface of the body assumes a dark blue colour. After a month, or a month and a half, the patient becomes bedridden, his eyesight diminishes, complete anæmia supervenes and the skin of the entire body is fissured. At last, when the face is cracked, slight fever ensues, vomiting sets in, and the patient succumbs within three or four months. Further, it is curious that if boiled or cooked rice is kept in the infected house, even for a single day, it also turns black. Some few years ago the same disease also appeared, but none of the doctors were able to find out the real cause, and not a single patient recovered. India, July 11, 1901.'

## Current Miterature.

To DRIVE Mosqui	TOES	AWAY :				
Oil sassafras	S			4.0	)	
Oil sassafras Oil wintergr	een				equ	ial parts.
Apply to exposed origanum are als unpleasant odour.	l porti	ions of y effec	body. ctive,	The but th	oils o	f cajuput and ave a rather
BITES OF INSECTS,	Mose	UITOE	s, etc.	:		
Ammonia wa Eau de Colo	ater				2.	2 dr.
Eau de Colo	gne					6 dr.
Apply with cotto	n swa	b.				
Ichthyol Petrolatum						2 dr.
Petrolatum						6 dr.
Apply freely. C	onside	red by	Oetti	nger t	he be	st application
for bites of any ins	ect.					200
Ichthyol Alcohol						1 dr.
Alcohol						31 dr.
Ether						31 dr.
Apply with came	el's-ha	ir brus	h. Th	ie alcol	hol ar	d ether must
1 " 10 11 6	1.1			77 7		

be mixed first before the ichthyol is added.

-Merck's Archives, July, 1901.

#### EXCHANGES.

Annali di Medicina Navale.
Archiv für Schiffs u. Tropen Hygiene.
Archives de Medicine Navale.

Archives Russes de Pathologie, de Médec., Clinique et de Bacteriologie.

Australasian Medical Gazette. Boletin de Medicina Naval. Boston Medical and Surgical Journal. Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology. British Medical Journal. Brooklyn Medical Journal. Climate. Clinical Journal.

Clinical Review.

Giornale Medico del R. Exercito.

Hongkong Telegraph. Il Policlinico. Indian Engineering. Indian Medical Gazette. Indian Medical Record.

Janus. Journal of Balneology and Climatology. Journal of Laryngology and Otology.

Journal of the American Medical Association.

La Grèce Médicale. Lancet.

Liverpool Medico-Chirurgical Journal.

Medical Brief. Medical Missionary Journal.

Medical Record.

Merck's Archives. New York Medical Journal. New York Post-Graduate.

Pacific Medical Journal. Polyclinic. Public Health.

Revista de Medicina Tropical. Revista Medica de S. Paulo. The Hospital.

The Medical and Surgical Review of Reviews. The Northumberland and Durham Medical Journal.

Treatment.

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### Motices to Correspondents.

- 1.—All communications will be acknowledged in the JOURNAL under the heading "Letters and Communications Received." Contributors who do not see their names in the list should communicate forthwith with the Editors or Secretary.
- 2.—Manuscripts sent in cannot be returned.
- 3.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
- 4.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.
- 5.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the
- 6.—Correspondents should look for replies under the heading "Answers to Correspondents."

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In order to meet the constant enquiry for addresses of respectable firms catering for the various requirements so difficult to obtain abroad, we give a list of names and addresses which we trust will be found useful to our numerous correspondents and subscribers.

### Original Communications.

#### MALARIAL AND FILARIAL DISEASES IN BARBADOS, W.I.

By George C. Low, M.A., M.B., C.M.(Edin.) Craggs Scholar, London School of Tropical Medicine.

THE analogy between malaria and filariasis is in many ways a close and interesting one, both, as far as the tropics are concerned, being very often found coexisting in the same districts, and both being spread from man to man by their own special species of mosquitoes.

It is, therefore, interesting to be able to point to a tropical island, namely Barbados, in which the former is non-existent, while the latter is extremely prevalent amongst all classes of the community.

The reason for the presence of the one and the absence of the other is supplied by the fact that Anopheles mosquitoes, the definitive host of the malarial parasite, are not found in the island, whereas Culex fatigans, one of the suitable intermediate hosts of Filaria nocturna, abounds (Brit. Med. Jour., June 1, 1901).

Before considering certain local features of these two infections a brief description of the physical characters of the island may be given with advantage.

#### DESCRIPTION OF THE ISLAND OF BARBADOS.

Barbados, the most easterly of the Caribbean islands, lies well out in the ocean by itself in latitude 13° 4' north, and longitude 59° 37' west, about 100 miles distant from St. Lucia and St. Vincent. It measures 21 miles long by 11 miles broad, and comprises an area of 166 square miles, six-sevenths of which consists of a formation of coral limestone, the remaining one-seventh being formed of different geological strata, namely, the Scotland series, consisting of sandstones and dark clays, and the oceanic series, consisting of white earths and chalks. (The

Geology of Barbados, Harrison and Jukes Brown, 1890.) The surface is more or less flat, the land rising gradually towards the centre of the island into two ridges, one of which running east and west attains a height of 400 feet above sea level, while the other to the north of this is about 1,000 feet high.

The population of the island numbers 200,000, 30,000 living in Bridgetown the chief town, and 1,500 in Speightstown the second town, while the remainder are scattered about in separate huts and hamlets or

in small villages.

With the exception of one or two springs, which bubble up and find their way into the sea within a few hundred yards of their origin, there are no rivers, the water supply for the town being obtained by boring into the large subterranean reservoirs of water which exist underneath the coral.

Several ponds and larger collections of water are found at different parts of the island, two such existing at Speightstown and Holetown respectively; three miles south of Bridgetown there is a permanent swamp.

In addition to these there is a creek communicating with the harbour, which runs inland for some distance in the centre of the town, and another swamp at the south of the island. The water in the latter disappears during the dry season. After heavy rains, and during the wet season, various collections of water are found in hollows and other situations, chiefly along the coast. The whole island is practically under cultivation, sugar cane being the staple product. Two seasons may be distinguished, a wet and a dry; the former in summer and autumn, the latter in winter and spring. The average rainfall is about 60 to 70 inches a year.

#### Malarial Fever.

On arriving in Barbados, and talking with the medical men practising in the town and island, they were unanimous in the statement that indigenous malarial fever does not exist in the island. Cases are frequently met with in the General Hospital; all of these come from some of the neighbouring islands where malaria is very common. No one could point to a case which had originated in the island itself.

The interesting question now arises, are any mosquitoes of the genus Anopheles to be found in Barbados or not? As may be gathered from what has been already stated, the features of the Island do not lend themselves very readily to the production of suitable breeding places for these insects, with the exception of the swamp at Worthing, three miles south of Bridgetown. This swamp is situated at the foot of some elevated ground quite close to the sea, with which it communicates by a canal, the exit, however, being very often blocked up with sand thrown up by the surf. It covers a considerable area of ground and is divided up into canals and ponds with roads and paths running through it in various directions. The water, especially in the part near the outlet, is slightly brackish, and in parts it is very stagnant, smelling strongly of sulphuretted hydrogen resulting from the decomposition of vegetable material. It is probably fed by springs of water, rain, and other collections which percolate from the neighbouring high ground. The surface of the water at many places is covered with algæ of various sorts and other forms of aquatic vegetation. On looking at it, it certainly appears to be a spot favourable to the development of Anopheles larvæ, but although larvæ of a species of Culex and those of dragon flies and other aquatic insects were always found in abundance, no Anopheles larvæ could be discovered. Confirmatory evidence of this was found in the fact that the people living in the vicinity never suffered from fever, but enjoyed remarkably good health. It is probable, from the close similarity of this place to Anopheles-infested swamps in the other and neighbouring islands, that such larvæ could live here perfectly well; whether they have ever been here and have died out, or whether they have never existed, is a matt r of speculation.

An examination of the other swamp at the south end of the island was not very hopeful, as at the time of my visit it had only filled up with water after some very heavy rain and contained practically no algae or other vegetation; no Anopheles larvæ were found in it, the only result of my search being a species of Culex in small numbers. The creek in the centre of the town is very dirty and muddy, and is really an arm of the sea fed at its upper end by rain and other waters. Several examinations produced no larvæ of any sort, the water being probably too dirty for any thing to live in. All the various ponds, springs and other collections of water, though often containing plenty of suitable vegetation, gave similar results; in some larvæ of Culex were found, in others nothing.

These observations coincide with the researches of Mr. Lefroy, entomologist to the Imperial Department of Agriculture, who has also made a systematic search for Anopheles larvæ with negative result.

The conclusions reached, therefore, bear out that suggested by the epidemiological fact that there is no malarial fever in the island, and once more go to prove that without mosquitoes of the genus *Anopheles* no malarial fever can exist.

#### FILARIAL DISEASES.

In marked contrast to the absence of malaria is the large amount of filarial disease in Barbados.

This is not to be wondered at when one considers the extraordinary abundance of the common domestic mosquito of those parts, Culex fatigans, which acts as an efficient host for the spread of the disease. It is an interesting fact that out of more than 600 blood examinations of people from all parts of the island only Filaria nocturna was found, Filaria demarquaii, which exists in St. Vincent and St. Lucia, and which I lately found in Dominica, never being met with. Although Bridgetown has now a very good water supply brought in pipes from the centre of the island, where it is pumped up from the subterranean collections of water, yet many tanks exist in the gardens of the large houses for watering purposes, and around the native huts barrels and tubs of water are kept and left standing for considerable times. In these situations myriads of Culex fatigans breed and multiply and eventually may act as propagators of the disease. An examination of the night blood of 600 cases (taken irrespectively of the patients suffering from disease or not) from the General Hospital, Central Almshouse, and from private sources, will show to what extent filariasis prevails in Barbados.

Race.	No. Examined	Non- Infected	Infected	
Negroes	 401	359	44	
Mulattos	 160	142	18	
Whites	 39	28	14	
Total	 600	529	76	= 12.66 %.

The proportion of fourteen infected whites out of thirty-nine is manifestly much too high to be regarded as representing the degree of infection in the white population as a whole. Many of these whites for one reason or another were collected in the almshouse at the time of examination, others being more or less selected private cases. The table indicates probably correctly the proportion of the coloured population affected. The figures referring to white people make clear a point on which sufficient emphasis has not been laid before, namely, that the white person is quite susceptible to filarial disease. This is specially so as regards Barbados, where persons, whether resident in the island all their lives or only visiting it temporarily, often contract the disease; the rich and poor are alike in this respect.

In analysing the table 27 or 4.5 per cent. of the total number examined, or 35.5 per cent. of the filarial cases, had definite pathological changes indicaive of filarial disease, such as elephantiasis, chyluria, filarial lymphangitis, &c.; whereas 49 of the filarial cases, or 8.1 per cent. of the total examined, had no symptoms whatever, the diagnosis being come to by the discovery of embryos in the blood. This latter class is a dangerous one as regards the spread of the disease; for it is manif st that unless sleeping under mosquito nets, which if they are negroes they never do, they nightly infect many mosquitoes, which in turn infect other people and so spread the disease.

To get some idea of the number of infected mosquitoes about, a series of dissections of 100 mosquitoes of the species Culex fatigans taken from the wards and corridors of the General Hospital, in which there were cases with embryo circulating in their blood, was carried out. Of this number 23 per cent. were found to be infected with Filaria nocturna at various stages of development, and in one mature forms were found in the proboscis, thus showing the danger of

being near infected people.

The question arises, what can be done for the prevention of filarial disease? Much has now been done and tried for the destruction of Anopheles, the malariabearing mosquito. Similar or modified methods should be carried out for all domestic mosquitoes. Considering that their breeding places are confined to houses and their vicinity, this should not prove a task at all approaching in magnitude to the draining of large swamps or to treating them in other ways. Taking Barbados as an example, as has already been stated, there is now a perfect water supply, and people can get their water fresh from the stand pipes at their doors. Such being the case, old wells ought to be filled up, no water barrels or tubs should be allowed, or, if kept, they should be emptied every week or so. Tanks and collections of water in gardens should all be periodically treated with kerosene or be furnished with closely fitting covers to prevent mosquitoes getting in. These methods are simple and inexpensive, and each householder should see that they are applied in his garden and grounds. The difficulty begins when one has to take into account the inability of the negro to grasp anything of a hygienic nature. The only way to get over this would be a system of sanitary inspection by a few competent men. For individual prophylaxis mosquito nets ought always to be used, but many, even educated people, still persist in sleeping without them; of course nothing in this line can be expected of the native population.

If such means were adopted for Barbados, the prevalence of filarial disease, which is at present quite alarming, could easily, with little trouble and expense, be greatly diminished, thus saving much suffering, as well as loss of time, hideous deformity, and, doubt-

less, in not a few instances, loss of life.

#### THE PERCENTAGE RELATION OF EOSINO-PHILES TO OTHER LEUCOCYTES.

By Edward Horder, F.R.C.S.Edin. Pakhoi, South China.

ALL books, when stating the percentage relation of the various forms of leucocytes in the normal blood, give the eosinophile percentage at 2 to 4. It had been noticed for a long time, when examining the blood of patients, that there were certainly more eosinophiles than this number in the Chinese. With a view to ascertain the correct percentage of eosinophiles in their relation to other leucocytes, of the people residing in this part of the world, it was decided to examine, for some months, every patient residing in the General Hospital, besides a large number of lepers living in a separate compound.

Before beginning with the patients, the blood of

assistants, nurses, teachers, coolies, &c., was examined. These Chinese men and women were in perfect health, with skins quite free of any disease whatever. The average percentage of eosinophiles was 15, some of the men having 18 and 19 per cent. The Europeans were next examined, and gave an average of 5 per cent., two showing 6 and 8.5 per cent. respectively.

Among the general patients, including something of everything met with in the East, in not a few very high percentages were found. Patients suffering from ulcers showed an average of 20 per cent.; from measles 26, but this is generally recognised; from chronic rheumatism, anæmia, eye diseases, and ordinary diseases of metabolism, an average of 22 per cent. One case of tuberculosis, 42 per cent. Malarial patients showed an average of 12 per cent., two cases giving 37.4 and 24.5 respectively.

The average percentage of eosinophiles among the lepers is high, viz., 30. In many cases 42 per cent.

was recorded.

Neutrophiles in nearly every patient gave a normal average, *i.e.*, between 60 and 70 per cent, the lymphocytes showing an average slightly above what is considered normal.

It is well known that in skin diseases, asthma, and helminthiasis, high values of eosinophiles are obtained, and doubtless many, very many, of the Chinese suffer from these complaints; but after allowing for these, we have still a large number of people who are not suffering from such diseases, and as many more who are being treated for trifling complaints only, but still show a very high percentage of eosinophiles, the cause of which remains unexplained.

My object in sending this communication is to obtain from your readers the percentage relation of eosinophiles to other leucocytes in various parts of the world, that something like a correct percentage

may be known regarding these cells.

It is quite certain the 2 to 4 per cent. for eosinophiles, stated in English, French and German books, does not hold good here.

#### THE CAUSATION OF BERI-BERI.

By Max F. Simon, M.D., C.M.G.

Late Principal Civil Medical Officer, Straits Settlements.

In a paper published in the Journal of Tropical Medicine for September, 1899, entitled "The Known and the Unknown in respect of Beri-beri," I endeavoured to show what had been done in endeavours to find out the cause of this disease, and what still remained undone, and I gave as my opinion that the best chance for the discovery of the cause lies in the domain of the pathological chemist, in the investigation of the chemistry of the blood.

Lately, Major Ross, F.R.S., of the Liverpool School of Tropical Medicine, has put forward a suggestion that, from the similarity of the symptoms of beri beri to those of the neuritis caused by arsenical poisoning (as evidenced in the recent arsenical beer troubles), the possibility of poisoning by arsenic being the cause also of some of the cases of neuritis hitherto returned as beri-beri should not be overlooked. This sugges-

tion is worthy of attention, and I think that Major Ross would not object to its being considered to include poisoning by any other metal. I would point out, however, that in poisoning by arsenic, and perhaps by other metals, symptoms appear to occur pretty frequently, such as pigmentation and other affections of the skin, and affections of the eye, which, to the best of my knowledge—and I speak from an experience of thousands of cases—are never met with in beri-beri. Moreover, considering the different circumstances under which outbreaks of beri-beri occur, it is difficult to imagine how a metallic poison could be introduced in many cases, unless through either the water or the cooking pots. The water in many outbreaks can be put absolutely out of court, and as regards the cooking pots, were they in fault, not only would cases of acute arsenical poisoning occasionally occur, but beri-beri would probably be worse in any institution coincidently with the use of new pots, a relation which remains to be proved. In this connection I may mention that some months ago the Health Officer of, I think, Manchester, wrote to Singapore to enquire as to the possibility of beri-beri neuritis being caused by arsenic. There was an outbreak of beri-beri at the time in the gaol there, and Dr. Kerr, the Principal Civil Medical Officer, had every article of food that could by any possibility contain arsenic tested for that metal by the Government Analyst with absolutely negative results.

It falls to the lot of practitioners in the Straits Settlements, and probably other Eastern countries, to see many cases of undoubted alcoholic neuritis, in which a suspicion of arsenical alcohol cannot possibly be entertained, and these cases present symptoms clinically absolutely indistinguishable from those presented by patients suffering from beri-beri, and I would suggest that, if a chemical poison be the cause of the latter disease, this poison belongs more probably to organic than to inorganic chemistry. Such poison may be either a toxin, manufactured, as Manson suggests, by bacteria (possibly the famous diplococcus), under suitable circumstances of environment, either inside or outside the body (probably outside), or it may be analogous to a product of fermentation produced under certain conditions of preparation or serving of food, or in some other way not yet suggested.

I would therefore again propose the chemical as a possibly profitable direction for investigation to take, and would submit as points for consideration:

(1) Proof of infectivity of beri-beri blood serum.

(2) A careful chemical analysis of beri-beri blood, especially of the serum thereof, and comparison with the blood of healthy persons.

(3) Comparison of conditions prevailing among bodies of men among whom beri-beri does break out, with those prevailing in communities where (or when) beri-beri does not break out, in respect of:—

(a) Anything in environment pointing in the former case to opportunities for toxin formation which do not exist in the latter; (b) any differences in methods of cooking, time of serving out after cooking, materials used in cooking (pots, &c.) which might in the one case favour chemical changes in the food, but not in the other; (c) any other differences which may strike

an observer as capable of producing effects in direction indicated.

Dr. F. W. Mott and Professor Halliburton ("Croonian Lectures on Degeneration of the Neurone, British Medical Journal, June and July, 1900) have shown the presence of cholin in the blood of beri-beri patients, this cholin being a result of nerve degeneration; they have once obtained a toxic effect from beri-beri blood that could not be explained by cholin. Experiments which have been made in the Straits Settlements, not, however, yet in sufficient number, tend to show that the serum of beri-beri blood possesses toxic properties in the direction of causing neuritis. I am told by Dr. Mott that "the fluids injected by Professor Halliburton and himself were prepared from the blood of beri-beri cases after treatment with alcohol; the alcoholic extract was evaporated to dryness over a water bath, and the residue, containing cholin, dissolved in normal saline solution. Such a mode of procedure would in all probability destroy unstable and coagulable toxins, e.g., the products of bacterial growth.'

It follows from the above that experiments in future should if possible be made with serum that is fresh, and that is taken early in the disease. The test for cholin is given in a footnote to the lectures referred to above.

## HOURS OF THE DAY AT WHICH THE "RIGOR" OF FEVERS BEGINS.

By Edward Horder, L.R.C.P. and F.R.C.S.Edin. Church Mission Hospital, Pakhoi, China.

The following interesting clinical note has been forwarded by Dr. Horder. Of 388 observations made during the first six months of 1901, 46 per cent. of the fever cases developed rigors between midnight and midday, and 54 per cent. between midday and midnight. As Dr. Horder remarks in his letter: "The truth is doubtless that the larger percentage of cases begin between 10 and 12 a.m., although a fair number do commence between 1 and 6 p.m." All the observations were made in males.

TOTAL NUMBER OF FEVER CASES OBSERVED, 388.

							A.M.				
Hours at which rigor commenced	1.2	2-3	3-4	4.5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
Number of cases	5	3	6	6	1	0	8	2	8	9	136
Percentage	1.2	-7	1.2	1.2	.5	0	.7	•5	1.8	2.5	35.5
	'			,				P.]	ч.		
Hours at which rigor	con	men	ced	1	1-3	3.5	1	5-7	7-9	9-11	11-12
Number of cases					81	71		48	7	1	1
Percentage				2	9.03	18.	1	2.3	1.8	-2	-2

WE are sorry that we omitted to mention that the blocks for the illustrations on p. 263, of our issue of August 1, 1901, were kindly lent to us by the editor of West Africa.

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## Journal of Tropical Medicine

**SEPTEMBER 2, 1901.** 

#### HONG KONG.

THE REQUEST FOR IMPROVED SANITATION.

SINCE 1894, Hong Kong, except in 1895, has had a yearly recurrence of plague. The consequence is that the residents are alarmed, their lives are constantly endangered, sea-borne trade, their one means of livelihood, is hampered and at times paralysed, and there seems no guarantee that this, the seventh outbreak of the disease, is by any means the last. It is therefore not to be wondered at that they are bestirring themselves and writing letters to the public press and forwarding petitions to the home Government. The foremost men in the Colony have forwarded a petition to the Right Honble. the Secretary of State for the Colonies asking him :-

(1) To appoint a Commission consisting of a person or persons wholly unconnected with the Colony to proceed forthwith to Hong Kong to

investigate and report (a) on the sanitary condition of the Colony; (b) on the measures to be adopted for the improvement of the city of Victoria and of the Colony as it at presents exists.

- (2) That you will be pleased to attach to the said Commission some independent sanitary expert to advise.
- (3) That after receiving and considering the Report of such Commission, you will give directions for the recommendations of that Commission to be forthwith carried into effect.

The petitioners also ask that they may be granted municipal powers to manage the affairs of the city, instead of these being left in the hands of the Government of the Colony. This is a question which, however, touches a tender spot in even our very advanced Colonial Office. Anything but that seems to be the watch-word. The inhabitants may have popular representatives on the Legislative Council, on the Executive Council, or have a Sanitary Board, provided that in the two former the official votes outnumber the unofficials, and that the Sanitary Board has no power bestowed upon it. But that the residents should decide upon the cleansing and watering of the streets in which they live, or should be empowered to decide upon a system of drainage for the town, or water supply for their houses, are requests which are viewed askance by those in authority. A writer in the "British Empire Series," vol. i, p. 514, deals with the Sanitary Board of Hong Kong as follows :-

#### SANITATION.

"So as to perpetuate the burlesque of pretending to govern by popular methods, we find in Hong Kong a Sanitary Board. The concession to the Board of a majority of unofficials was rendered completely futile by withholding all executive power from the Board. It is merely a deliberate body, with power to recommend to the Council. So intolerable and repugnant has the position of the unofficial members become, that at the present moment the majority have tendered their resignation. This step is one which every right-minded person who retains a scrap of the sense of dignity due to his privileges as a British subject was compelled to take. The elector, trained in Britain to believe that he is entitled to a 'say' in the affairs of the Crown colony in which he takes up his residence, will be woefully disappointed. He must politically throw himself back to ante-Magna-Charta days; he must be content to lay aside all the freedom his forefathers

fought for, and submit to a regime of autocratic rule paralleled only by political life in Russia. Nay, more than this, he must expect to find himself made a burlesque of, inasmuch as he is given a vote which has no influence, and a voice in public matters which has all the machinery of Government against it and fit to render it abortive. A wise autocracy is perhaps the ideal form of government, but it is one British subjects have been trained to look at askance, and it is a little difficult to recur to a system which for well-nigh a thousand years has found no favour in Great Britain."

Hong Kong, from a sanitary point of view, deserves to be carefully studied, for here plague during the modern pandemic first reached a European settlement, and there it has remained for seven years. What is there in the city of Victoria or in the villages of the island of Hong Kong to thus attract and harbour plague? The water supply is excellent, the drainage is on the most approved "separate" or "dual" system. There is not only an ample Colonial medical staff practising in the hospitals, but there is a special Medical Officer of Health, a Sanitary Board, sanitary inspectors, &c. A veterinary surgeon sees to the condition of the imported cattle, the markets, the meat and milk supply, and the slaughter-houses. The city is, moreover, built on the steep side of a granite mountain, the rainfall is between 80 and 90 inches, and the fall towards the sea for the most part abrupt. What element in the sanitary armour therefore is deficient? We will take these seriatim. The water supplied to the Colony, although of good quality is deficient in quantity; well nigh every spring there is a shortage, and just as the hot weather sets in the water supply is cut down to sometimes quite a small quantity. This is serious in a city in a hot climate, and it is, circumstantially it may be, at this period of the year plague has invariably recurred. The drainage system of the Colony, laid down at a great cost, is perhaps not the one best suited to this particular city, or perhaps to any city in a tropical climate. The sewage is carried off in a nine-inch pipe, quite apart from the stormwater channels, so that the heavy rainfall benefits but indirectly the sewerage drains. The very fact of the city being built on so steep an incline also causes the contents of the sewers to be carried along at a great pace, leaving the pipe

empty and converted into a ventilating shaft for the sewer gases emanating below. Owing also to extension of the foreshore by reclamation from the sea, the lower ends of the drain pipes and channels, which end in the harbour, runs for perhaps 100 yards along the flat reclaimed part, where they are subject to the ebb and flow of the tide. Previously to the reclamation the drains terminated with a good fall right down to the sea-shore, but a long level stretch now necessitates a stay in the rapidity of the discharge, and the tide dams the lower end of the drains and forces the contents back and the gases upwards, so that twice in every twenty-four hours all parts of the city feel the effects. This condition of affairs favours the development of plaguebearing rats, so that the separate system of carrying off storm water and house drainage, although perhaps admirable for a city in temperate climates, would appear to be unsuitable to a tropical city. Yet how was this brought about? By the very means now being sought after by the petitioners.

In 1881-2 and 1889-1890 an expert, unconnected with the Colony, was brought out to Hong Kong, and his opinion on the sanitation taken. Few, very few of his recommendations were acted upon, in fact we know of but one, namely, the adoption of the "dual" system of drainage. His plan was opposed, almost virulently, by sanitary engineers, architects, medical men and by almost all the members of the British community who took any interest in sanitary affairs. Yet was the present system of drainage forced on the Colony, and the men in the service who favoured the scheme were promoted, and those who opposed it were neglected and set aside. So far, therefore, the excellence of the water supply, and the up-to date system of drainage are myths, the former being insufficient and the latter altogether unsuit-

Turning for a moment to the other equipments of Hong Kong. The Sanitary Board ought to be surely a useful body, for it is composed mainly of practical men, elected in some instances, and selected in others, to represent the residents; the unofficial members are, moreover, in a majority,

and it would appear that even in a Crown Colony an enlightened form of dealing with municipal affairs had dawned. No such thing; the Board, when it was created, was given deliberative powers only, a mere "talking" assembly, without executive power. The Board, by the Governor who called it into being was intended "only as a buffer between me and the public, so that the abuse meant for me may be directed on the heads of the members of the Board." The Sanitary Board, therefore, although figuring so well on paper, is functionally a powerless body. The Medical Officer of Health also is a Government servant and under the Principal Medical Officer of the Colony; there is therefore a distinct limitation to the scope of his powers. In fact, everything is concentrated in the hands of the Governor, and the smooth working and advancement of this Colony, as in other Crown Colonies, is totally dependent in the quality of man who is the governor for the moment. It is the system of Crown Colony government that the residents of Hong Kong are really petitioning against when the matter is sifted to the dregs; the sanitary question is the one which for the moment has surged to the surface.

There are other difficulties in stamping out plague from Hong Kong. There is the proximity of Hong Kong to Canton, and the mainland of China. Although an island, the traffic between Chinese and British territory is enormous and continuous. Hundreds of coolies travel by steamer daily between Canton and Hong Kong, and Canton we know to be a plague-infected The extension of British territory also in the Kowloon district, situated on the mainland of China across the narrow strip of sea between the island and the mainland, renders isolation still more difficult, so that to all intents and purposes the island itself is part and parcel of the Chinese province of Kwang-tung. Hong Kong also has flourished so that property has risen in value enormously, necessitating overcrowding if the Chinese coolie is to obtain a livelihood at all, owing to lodging being expensive.

Were the petitioners to gain their point and obtain the control of their municipal affairs, were

an expert in sanitary matters to be sent to their assistance, and were all their other requests to be granted, many of the difficulties as regards stamping out plague in the island of Hong Kong would still remain; and it must not be imagined that by securing their ends a panacea would necessarily follow. The simplest way of dealing with the matter would seem to be, if municipal powers cannot be granted, to bestow upon the Sanitary Board executive powers—surely a just demand, for it is intolerable for earnest men to devote their time and attention to the welfare of the Colony by occupying seats at the Sanitary Board, where they are merely given place and opportunity so that they may serve as a buffer between the public and those upon whom the blame, if there is blame, should rightly fall.

### Reprints.

#### THE SERO-THERAPEUTICS OF PLAGUE.

By John Brownlee, M.A., M.D.Glas., D.H.P.Camb.

Physician Superintendent, City of Glasgow Fever and

Smallpox Hospitals, Belvidere.

In giving an account of my experience of the treatment of patients suffering from plague with Yersin's serum, as received from the Pasteur Institute of Paris, it may be well to point out that the disease as it occurred in Glasgow was apparently of a much milder type than is that usually seen in the East. The number of cases was too small to admit of statistical comparison between those treated with the serum and those not so treated, and on account of the mild character of the epidemic comparison with the statistics of other epidemics in other countries is not possible. Consequently the value of the treatment can only be gauged by a careful consideration of each case in detail.

The first two cases in which the serum was given were reported in the September (1900) issues of The Lancet. In both these cases the only organism obtained in puncturing the buboes was the bacillus The first of these cases belonged to the septicæmic variety of plague with multiple bubo. The prognosis was bad. Within thirty-six hours of the administration of the serum the temperature fell nearly to normal and the patient was apparently out of danger. In the second case, which appeared to be an example of the fulminant type of plague, an injection of 20 cubic centimetres of the serum intravenously, and of a like amount subcutaneously, was followed within twenty-four hours by a complete cessation of symptoms. Both patients were excessively ill, and in both the subsidence of the symptoms was marked and immediate. There were, it is true, some cases

of plague untreated by the serum in which there was a critical fall in the temperature, but in these the disappearance of the mental obscuration which accompanied the fever was much more gradual and the convalescence more tedious. In both the cases under consideration a symptom was present not observed in any of the other cases which ended by crisis—viz., a few hours after the injection a copious sweating occurred over the whole body.

The next three persons treated by serum suffered from a milder type of the disease; in only one was the prognosis doubtful. The first was a case with right inguinal bubo, from which on puncture a pure culture of bacillus pestis was obtained. The patient on admission did not seem sufficiently ill to require an injection of the serum, but two days later, as the symptoms had considerably advanced, 20 cubic centimetres were injected subcutaneously into the abdominal wall. The next day the symptoms had somewhat abated. pain in the bubo was less and the reddening of the skin over the swelling was not so marked. In the evening, however, the patient's condition was again not so good, and by the following morning the temperature had again risen. The local condition had advanced and the infective process had extended so as to involve the lymphatic glands above Poupart's ligament and also the deep inguinal glands. A further injection of 20 cubic centimetres of the serum was then given, this time into one of the veins of the right arm. An immediate improvement was noted. Six hours after the administration of the serum the temperature had become normal, and on this occasion no subsequent rise took place such as had occurred after the former dose administered subcutaneously. In a second instance the result was equally interesting. This patient, a girl aged 14, suffered from a bubo in the left axilla. The point of entry of the infection was evidently located in the back, where, as described in the full report, a small pustule was situated which was proved bacteriologically to contain the plague bacillus. The external local condition afforded a visible index by which the therapeutic effect of the remedy could be gauged. Here again a subcutaneous injection of the serum was followed by a temporary improvement as regards the bubo, the pain being considerably less on the next day, but no improvement could be seen in the pustule above mentioned. A recrudescence of the disease occurred likewise in this case, with a rise of temperature to 102° F. A second pustule began to form on the back, while the erythematous zone surrounding the first occurring pustule became rather larger. Here again the intravenous injection of the serum in a dose of 20 cubic centimetres was followed by an immediate improvement. Within twenty-four hours a slough in the centre of the original pustule had separated and the inflammatory zone had almost disappeared, while the second commencing pustule had completely aborted. The patient, six hours after the administration of the last dose of serum, spontaneously expressed herself as feeling very much better. The temperature by the same time had fallen to normal and, as in the other case just mentioned, it remained so without subsequent Convalescence from this point was rapid and uninterrupted. The third case belonging to this group

was the mother of the preceding one, aged 41 years. She had a right inguinal bubo. On admission the temperature was 102.4° F., the pulse was 104, and the respirations were 24. The patient was evidently ill, though a fatal issue was not expected. A subcutaneous injection of 20 cubic centimetres of the serum produced almost no effect, but there was, if anything, next day a lessening of the pain in the bubo. Thirtysix hours later a second injection of 20 cubic centimetres was given intravenously. As in the other two cases just noted there was observed an almost immediate improvement, the patient expressing herself as being much better six hours after the remedy had been administered. The temperature fell to normal within twenty-four hours and remained there.

The points to be noted with regard to all these cases are that the subcutaneous injection of the remedy produced little effect, and that of a temporary nature, while the administration of the serum intravenously was followed in each case by an improvement which was easily seen in the subsidence of the signs of illness, and which besides was spontaneously borne witness to by the patients themselves.

The serum was also administered to four persons in whom the disease progressed to a fatal issue.

A general review of the action of Yersin's serum

falls to be considered under two heads-firstly, the prophylactic action; and secondly, the curative action.

(1) The preventive action of the anti-plague serum.— Of the healthy persons who had been in contact with plague and who received a prophylactic injection of the anti-plague serum two developed the disease. One of these was a maid attached to the service of the plague wards. From her buboes the specific bacillus of plague was recovered, and at the appropriate time after the disease was over her blood gave the typical agglutinative reaction in a marked degree. The other was the mother of one of the patients who died. During the course of the disease the pyrexia was fairly high, but she never gave the impression that she was dangerously ill. Three factors which might have contributed to produce this high temperature are

These two cases prove that a dose of 10 cubic centimetres of Yersin's serum administered subcutaneously does not afford complete protection, yet it is a fair presumption that a certain degree of immunity is afforded, as the symptoms in both cases were of great mildness. This corresponds with what has been frequently observed with regard to the action of diphtheria antitoxin when used as a prophylactic. Immunity is not a certainty, but if the disease becomes established the attack is almost certain to be

slight.

(2) Curative action.—A general review of the facts given above and a consideration of the reports of the individual cases will, I think, justify the following conclusions: First, that subcutaneous injection of the serum is not of any great curative value. This is probably not due to the blocking of the lymphatics during an attack of plague, as has been suggested by some, in view of the fact that absorption of the serum by healthy persons is no more rapid than that seen in the plague patients. The failure in action is therefore much more likely the result of the lymphatic

system exercising a distinct action as a biological filter on the serum, such as exists in other organs. In this way the antitoxic substances of the serum are retained largely in the glands which drain the area into which the injection is given, so that only the more inert portions of the serum reach the general circulation. It was noticed that the lymphatic glands connected with the area into which the injection was made in healthy persons enlarged for some days thereafter. This is not a proof that such a filtering action as above indicated takes place, yet it shows that some constituent of the serum having an irritant action is retained, and if the glands possess the power of filtering out certain ingredients of the serum, there is no reason to doubt, in the light of what has gone before, that this may include the active antitoxin. One case lends some clinical support to this view. The inguinal bubo, into the drainage area of which the serum had been injected, showed post-mortem evidence of a potent local effect in the marked degeneration of the bacilli, while the organisms found in other parts of the body were quite normal. It is therefore evident that subcutaneous injection of the serum can be efficient only in cases where the infection is localised to a bubo, and has not become general. Secondly, the intravenous injection of the serum seems, in most cases, to produce a most marked therapeutic effect, even when given late in the disease. In those cases, on the other hand, where double infection has existed from the beginning, its action is greatly lessened. In conclusion, it is probable that the doses given were in general too small, and should an opportunity again arise of using this remedy, large initial doses of 60 cubic centimetres and upwards would be given intravenously. Probably it would be advisable, if using the serum subcutaneously at all, to inject it only into the area drained by the lymphatic system which leads directly to the bubo.—Abstract from "Lancet," Aug. 17, 1901.

EXPERIMENTS WITH THE DANYSZ RAT BACILLUS.

By E. Klein, M.D., F.R.S., Lecturer on General Anatomy and Physiology at St. Bartholomew's Hospital.

HERBERT WILLIAMS, M.D.LOND., D.P.H.CANTAB., Medical Officer of Health of the Port of London.

That the rat has been instrumental in spreading and communicating bubonic plague to the human subject is a statement which has been well established by past experience, and it has therefore become a matter of great importance to all medical officers of health, notably those connected with seaports, to find means by which rats in docks, harbours, sewers, warehouses, &c., could readily and quickly be destroyed on a large scale without any deleterious effects on other animals. As is well known, Danysz maintains that the bacillus which is known as the Danysz rat bacillus achieves this by giving to rats an acute, fatal septicæmic disease which, by ingestion of the bodies of infected and dead animals, rapidly spreads amongst them and consequently readily destroys them or

causes them to migrate from the locality. Experiments were instituted both in the laboratory and on a large scale in one of the warehouses of a dock in the Port of London in order to test this alleged destructiveness of the Danysz cultures and of animals dead after injection with such cultures.

The point to be determined was whether, as Danysz maintains, the culture of this bacillus is capable of causing death in a large percentage of rats fed on its On this point the opinions of various observers differ; while, for instance, Kister and Köttgen, of Hamburg, to a certain extent confirm Danysz's statement, others,

like Krausz,2 failed to confirm it.

1) Experiments in the laboratory.—There is no difficulty in showing the high virulence of the Danysz bacillus for rats, mice, and guinea-pigs, if inoculated subcutaneously or intra-peritoneally, but it is different when the material is administered by ingestion. While it is a fact that virulent culture injected subcutaneously in a five-division dose into each of twentyfour mice caused death of all the animals in between twenty and forty-eight hours, when administered to other mice by ingestion in large doses it caused death of these animals in three, five, and eight days respectively. But the results were different with rats, for in these the feeding experiments with culture produced death in only 33 per cent. between eight and fourteen days. There appeared, however, to be a chance of causing death of a larger percentage of rats by feeding these on rodents dead of the disease after subcutaneous injection. Rats were fed on mice which had died in forty-eight hours after being subcutaneously injected with virulent culture. None of these rats became ill or died. A number of rats were fed on guinea-pigs which had died after inoculation with virulent culture, and here the percentage of dead rats was certainly increased. Of six rats fed with the material from the guinea-pigs (subcutaneous fluid, peritoneal fluid, and spleen) four died from the disease in eleven, twelve, eleven and eighteen days respectively; and of three rats fed with one whole guineapig two died from the disease in seven and eleven days respectively.

(2) Experiments in the warehouse.—The results of experiments of feeding on a large scale carried out in a dock warehouse in the Port of London, instituted by Dr. W. Collingridge, the late medical officer of health, and continued by the present medical officer of health are given in a tabular form. It ought to be stated in explanation that the sixty tubes of Danysz rat virus used between April 26 and May 31, were culture tubes (on agar) which had been directly obtained from the Pasteur Institute of Paris, and that the guinea-pigs, mice and rats used for the feeding experiments from June 14 to July 17, had all been inoculated subcutaneously in the laboratory with virulent culture of the Danysz bacillus, and immediately after death from the typical disease were laid on the floors of the warehouse. We would also draw attention to the fact that one rat which had died after subcutaneous injection of the typical disease was offered to the rats in the warehouse, but was not

Deutsche Medicinsche Wochenschrift, May 2, 1901, p. 275.
 Ibid., May 30, 1901, p. 351.

touched by them, whereas all the mice and the majority of the guinea-pigs were readily eaten by the rats of the warehouse.

Unlike the laboratory experiments those carried out in the warehouse were wholly negative, and therefore, the expectation of the medical officers of health of a wholesale destruction of rats by Danysz rat bacillus, as a preventive measure against plague, cannot be considered from the results of the experiments to be

of a promising nature.

It should be also stated that several rats that had not become ill after feeding with mice or with guinea-pigs or directly with culture, were afterwards subjected to subcutaneous inoculation with small doses of virulent culture. They promptly became ill and died with the typical disease, thus showing that the susceptibility of the rat to the disease by subcutaneous injection is

incomparably higher than by feeding.

It should be further stated that all laboratory experiments on rats kept in captivity mu-t be conducted with care, since these animals, according to our experience (confirming that of Krausz), are liable to succumb spontaneously. In our experience 25 per cent. of the animals die in captivity within the first week or ten days. On the other hand, those that remain alive and well after the first week or fortnight of captivity may be considered fit subjects for the experiment. It is possible that the great mortality of the laboratory rats observed by Kester and Köttgen may be due to this fact and not to their having been fed with the Danysz culture.—Abstract from "Lancet," Aug. 17, 1901.

HONG KONG. CLINICAL REPORT ON MA-LARIA, AS SEEN IN THE GOVERNMENT CIVIL HOSPITAL DURING THE HALF YEAR 1901.

By Dr. J. Bell, Acting Principal Civil Medical Officer, AND

Mr. G. STEWART (Lieut. I.M.S.) Acting Assistant Superintendent.

THE authors state that they have been instructed by Captain Johnston, I.M.S.—a co-worker of Major Ross—in the technique of the examination of blood for malaria, the various forms of the disease and the deductions to be drawn from an examination of a blood slide. They determined this year to examine the blood of all patients with fever and as many as possible with symptoms suggestive of malaria, and the results of their observations are embodied in this They make no claim whatever to being authorities on malaria, but have simply recorded facts which have come under their notice clinically. They have dealt with over 400 cases, in the majority of which malaria has been present, if not at the first examination at a subsequent one, and it is possible these facts may be of interest to others.

Their report (abridged) reads as follows:

#### PHTHISIS.

The combination of malaria with this disease is very important as well as very interesting. Of seventeen cases examined fifteen were complicated with

malaria. Hong Kong and, we believe, most tropical countries are looked upon as being very prejudicial to the cure of tubercle. Amongst the Chinese here it is generally, and probably rightly so, to a certain extent, put down to overcrowding and insanitary surroundings, but this does not apply to Europeans and Indians who form the bulk of our patients and who suffer quite as much as the natives. We are inclined to think that the malarial combination accounts in a great measure for the rapidity with which the disease advances. Several of the cases have come in two or three times for fever without anything but malaria being found until eventually they have returned with another attack of malaria, the sputum previously negative now full of tubercle bacilli and the lung symptoms in full swing.

Unfortunately there is a reverse side to this picture, as in most of the cases after one or two attacks of malaria, the fever does not subside but takes on the hectic type and the case goes downhill. In this disease we think it is as well to examine for malaria, as we are inclined to think the combination much more prevalent than is generally supposed or even than our figures show. Another practical suggestion we would offer is that in all cases with fever and cough, however slight, though there are no lung symptoms, an examination of the sputum should be frequently made. We have by this means detected several cases in the very earliest stage, i.e., the stage when treatment or change holds out most hope. As a diversion we may add that all phthisical cases have been treated routinely with chinosol, but we have found that the drug has no effect on the disease, and after a long course the bacilli are still as numerous as ever. It has therefore been abandoned here and must, we think, be added to the long list of reputed specifics for this disease which have been found wanting. Carbolic acid in large doses has been substituted and the result will be duly recorded.

#### LIVER ABSCESS.

Only two cases have been under treatment and both showed malaria in the blood. It is laid down by the authorities that malaria does not produce suppuration in the liver, but both our cases are against this view.

#### APPENDICITIS.

The combination of malaria with this disease is interesting. We have only had two cases and both showed malaria. One came in with malaria and later on complained of the appendix trouble. The usual operation was performed successfully.

#### Dysentery.

The combination of malaria with this disease is extremely common. Out of 37 cases examined 35 showed malarial parasites. None were fatal, though one or two were very obstinate and none were followed by heparic abscess. Needless to say we found quinine most useful in addition to the saline and ipecacuanha treatment. We would almost say that, if a case of acute dysentery does not improve in forty-eight hours under the latter treatment, it is combined with malaria and requires quinine either by mouth or by enema.

TYPHOID FEVER.

The combination of malaria with this disease is most interesting to tropical practitioners. Without a post-mortem examination our diagnosis in some of these cases may be called in question, but they were all seen several times by other medical men who agreed with the diagnosis in every case, and if they were not typhoid it would be difficult to explain the long continued fever. Of the ten cases examined all showed malaria. The effect of the malaria on the chart was various. In some cases for several days the temperature intermitted regularly and markedly until, apparently, the malaria dropped out and the typhoid element had free play; in others, however, notwithstanding quinine, there was no intermission, and the chart from the beginning was very suggestive of typhoid. We have not found much assistance from Widal's reaction, which in most of our cases has given a negative result—as late as the sixteenth and twentieth day in two fatal cases. Our only dictum on this subject is that held by most other practitioners—if after thorough treatment by quinine for ten days the temperature does not fall in the absence of any symptom to account for the continued rise, the case is in all probability typhoid and purgatives should be withheld. Typhoid is held to be a more fatal disease in the tropics than in temperate climates, but why this is so is not quite clear, unless the malarial element, which is present in the greater number of cases, has something to do with the high rate of mortality. The previous treatment of the malaria tends, we think, to keep the typhoid temperature lower than it would otherwise be. Our rate of mortality was 30 per cent.

#### PLAGUE.

Up to date eight cases have passed through the hospital, all being admitted as malaria and parasites being found in each case. It is very desirable to keep these cases out of a general hospital, as it entails such a lot of extra disinfection and there is always a riskthough small-of some of the other patients or the staff contracting the disease. We do not, however, see how this can always be managed. We were both on the alert throughout the plague epidemic and yet failed to detect some of these cases until they had been some time in hospital. We have not been very successful in finding the plague bacillus in the blood in these cases until the case was far advanced. Professor Kitasato states that it is rare to get them in the early stage, and if present there may be only one in a whole slide. Detecting it under these conditions must be due to good luck. The invention, by some bacteriologist, of a double stain, similar to Gabett's for tubercle bacilli-one of the most useful ever invented-would be a great boon.

#### RHEUMATISM.

Nine cases were examined, six being positive and three negative, one of the latter, if not two, being due to gonorrhœa. Acute rheumatism is said to be rare in this colony, and our experience bears out this view; but there is a great deal of what, for want of a better name, is called "rheumatism." Patients who have no swelling in the joints, and little or no fever, come to hospital complaining of nothing but pains in or

about the joints. It is, in these cases, extremely difficult to be sure one is not being imposed upon, as "pains all over" is a favourite way of getting a few days' rest, but we cannot help thinking that if more of these cases were examined it might turn out that some of them were really a form of malaria. If this disease produces inflammation of the nerves and their sheath one does not see why it should not equally affect the fibrous ending of muscles or joint ligaments, without giving rise to any objective signs much in the same manner as syphilis does. For obvious reasons, not many of these cases are admitted to hospital, so we have not been able to collect more cases.

## JAUNDICE.

This is by no means a common sequelæ of malaria, though hepatitis is common enough. Four cases were examined and three showed malaria.

#### HEPATIC COLIC.

One case was under treatment and his blood showed mixed malarial infection. Under quinine and morphia he recovered without jaundice.

## Beri-Beri.

We do not see very much of this disease owing to our limited accommodation. Five cases were examined and three showed malaria.

#### PNEUMONIA, PLEURISY AND BRONCHITIS.

Of these diseases thirteen were examined, and in nine malaria was present. None of the cases were fatal. It is a question as to whether a good deal of what used to be known as "influenza" in this colony was not malaria with a lung complication, the pains in the muscles, &c., being due to the malarial element.

#### ASTHMA.

It is an interesting fact that malaria has been recognised as a cause of this disease long before the parasitic days, though no one has yet attempted, as far as we know, to explain the pathology. The disease is not very common here. Seven cases were examined, and in six the malarial parasites were present. Hypodermics of quinine and morphia we found the best treatment.

#### NEURALGIA, &C.

Malaria has long been looked upon as a cause of inflammation of nerves or of effusion in their sheaths. These, not being exactly hospital cases, did not come much under observation, and we cannot say if this is a common form of malaria here. Two cases only of neuralgia were examined, one of which was positive. The negative one subsequently turned out to be due to syphilis. Two cases of sciatica were examined, both being of malarial origin. They were so obstinately recurring that both patients were invalided. Hypodermics of quinine in the line of the sciatic nerve is the best treatment, and it is just sufficiently painful to prevent malingering, for the disease, being one entirely of subjective symptoms, offers a fair field for a rest in hospital.

COLITIS.

Only one case of this disease came under treatment; malarial parasites were found in the blood. The patient recovered with quinine and saline purges.

DIABETES.

The only case of this kind which came under our notice was that of our Hindu cook and interpreter, an old Government servant of some twenty years' service and a subject of diabetes for over eight years. The disease seems to have absolutely no effect on him, although when in hospital with his malarial attack he was passing over four grains to the ounce.

ALCOHOLISM.

Only a few cases were examined, two of which were positive and one negative. We have not had many opportunities of investigating these cases for malaria, but we think there is little doubt that over-indulgence in alcohol, with the exposure which generally goes with these cases, helps to precipitate an attack of malaria in anyone who is already infected with the disease.

CHYLURIA.

This case was interesting as the fever was due to the malaria and not to the filaria. In a very few days, under quinine, the fever disappeared.

PURULENT MENINGITIS.

Only one case of this disease occurred.

A Chinaman from Manila was brought to hospital in a dying condition and without any history of his The presence of malaria in his blood led to the belief it was a case of malarial coma. examination after death showed extensive suppuration at the base of the brain extending up both sides and without any primary cause apparent either in kidneys, liver or elsewhere. Another case might here be mentioned which, by a curious coincidence, came under the notice of one of us (Dr. Bell) a few days after at the public mortuary. As no internal cause of death was evident the brain was examined and a precisely similar condition to the above was found. A smear from the spleen also showed recent malaria. Is it possible to get purulent meningitis as a result of wholesale blocking of the vessels of the brain or meninges by the malarial parasites?

Pernicious Anæmia and Malarial Cachexia.

One case of each of these diseases came under notice, and both had the malarial parasite present in the blood. Both, I regret to say, ended fatally.

SYPHILIS.

Only four cases were examined, and three showed malaria.

ABSCESSES.

Four cases were examined, and in all malaria was present.

INJURIES.

The shock of an injury, even when very slight, seems frequently to bring out an attack of malaria. Of nine cases examined five showed malaria.

GONORRHŒA.

Four cases of this common complaint had fever and their blood was examined. All showed malaria, and under quinine the fever rapidly subsided.

ERYSIPELAS.

Only two cases of this disease were met with. Malaria was found in each and both were very bad, probably owing to the complication. They, however, did well.

MEASLES.

Two cases of this complaint were under treatment, one being complicated with malaria.

NEGATIVE RESULTS.

A few other cases with fever, slight or otherwise, were also examined, but gave negative results. They comprise cases of burns, dyspepsia, endocarditis, otitis, anæmia, and hepatitis. The shock of a burn should, we think, produce an attack of malaria, and further investigations on this head are required. We were only able to examine one case.

MALARIAL FEVER (UNCOMPLICATED).

Of these cases—perhaps the most interesting of the record—261 were under treatment during the past six months out of a total of 1,323 patients. There is, therefore, a fair amount of material available for the study of the disease in this hospital. Of this number 216 were of the malignant variety, which is here at any rate by far the most common form of Simple tertian fever occurred in 30 the disease. cases, and only one quartan came under observation. The latter variety would therefore seem to be extremely rare, which is perhaps fortunate, as it is stated to be very unamenable to quinine and tends more to produce anæmia than the other forms. Fourteen cases of mixed infection were also seen, but the combination of two forms of malaria in the same patient does not appear to make the case more serious or more obstinate. One policeman, who has been in three times, always has the mixed infection. In pondering over malaria, as viewed clinically, one cannot help being struck with the various forms of the disease, which are all due to the same cause. From the patient who either has no fever, or a fever which after a few hours disappears, leaving him well and able to get up, to the patient who is suddenly overwhelmed with coma, and in spite of all treatment passes away after only a day or two's illness, occur all shades of the disease, some yielding rapidly to treatment and causing no anxiety, others running their own course without, as far as one can see, any cause for the continued fever or for the difference between any two cases.
"Coma" malaria is very interesting.

"Coma" malaria is very interesting. The five cases we had were all very serious and two ended fatally. Only one was in a Chinese, so that it would appear as if Europeans were more subject to this form.

MALARIA WITHOUT FEVER.

Two cases of this anomalous form occurred.

(1) Was admitted on January 24th with crescents and sporing quartan parasites in the blood. On 25th, quartan, 28th quartan and malignant tertian, and on the 31st crescents and malignant tertian were found. No rise of temperature throughout.

(2) Admitted January 30th, with malignant and simple tertian parasites en masse. Patient felt very seedy but had no fever. Under tonics and quinine he

recovered.

In some few cases quinine did not seem to have much effect on the temperature, though why this was so was not clear.

#### CLASSIFICATION.

As there seems to be some difference amongst authorities as to the nomenclature of malarial parasites, we have adopted that suggested to us by Captain Johnston, which we believe is that used by Major Ross. It seems to us both simple and scientific:

Simple Malarial.—Simple tertian and quartan.

Malignant Malaria.—(1) M. tertian (ring-shaped parasites with pigment). (2) M. quotidian (ditto with-

To distinguish between the two forms of malignant malaria involves so many examinations of the same blood that we think it is sufficient to differentiate between the simple and malignant forms, which is what we now attempt to do.

## TREATMENT.

Though we have nothing new to bring forward under this head, a clinical report would hardly be complete without a few words on the subject.

#### PROPHYLACTIC.

This hardly comes within the scope of a report of this kind, but we think we have shown that, until the day dawns when the mosquito will cease from troubling, a good deal more attention must be paid to endeavouring to prevent such conditions arising as precipitate a second attack of the malady. Briefly this consists in good and cheap food, good water, well ventilated and dry houses and avoidance of all excesses.

#### CLINICAL TREATMENT.

Our experience in this direction has been solely

with quinine.

We tried what, we believe, is known as the foreign method, viz., a large dose either at the fall of the fever or at its height, and we gave 15, 20, and 30 grains, in some cases in the morning, and in others in the evening. As far as our fevers go this system is useless, or not nearly as effectual as the old way in vogue in this hospital to which we have returned. This consists in giving quinine in 5-grain doses every two, three or four hours, irrespective of the fever or the condition of the parasites as seen in the blood. We have no hesitation in saying that for this country this is the best method and gives the best results. The use of antipyretics (phenacetin, antipyrin, &c.) we have entirely given up as we think their employment depressing, and of course quite useless, as far as the destruction of the parasites go. In combination with the quinine we give a diaphoretic mixture (liq. ammon. acet. 4 drs. and pot. acetat. gr. xx.) every four hours whenever the temperature rises above 102° or 103°. This acts as a diuretic and diaphoretic, and is, at any rate, harmless, though personally we have a high opinion of it as tending to the comfort of the

We may add that given in the above frequent doses we have seen no ill effects, nor have any of the patients complained of anything more than a

temporary deafness.

We may also state that we tried in one case iron in large doses and quinine in small (tr. ferr. perchlor. m xx., quinine gr. ii.) every three hours, as recom-

mended by a West Indian practitioner—and we certainly agree that it is worth a trial in those few cases which resist quinine.

Diet and the after use of tonics call for no remarks. Sir William Jenner's, dictum "feed your fevers," is as true of this fever as of any other.

#### LIVERPOOL MALARIA EXPEDITION.

Major Ronald Ross, F.R.S., according to a telegram in *The Times* of August 20th, is returning to England to organise an expedition to deal with the prevention of malaria by the destruction of mosquitoes. which is to be despatched to the Gold Coast and the Gambia. The sixth expedition sent out by the Liverpool School of Tropical Medicine is at present at Sierra Leone. The medical men engaged there at present are Dr. Logan Taylor, Dr. McKendrick and Dr. C. W. Daniels, the Superintendent of the London School of Tropical Medicine. The expedition about to be despatched to Gambia will be the seventh which the Liverpool School of Tropical Medicine has organised. As an example of the style of work performed by expeditions of this nature, the following

statement by Major Ross is interesting:

"The work (says Major Ross) is proceeding very We have twenty-four men, twelve of them supplied by the Governor, constantly engaged in draining away the Anopheles pools, and some of the most waterlogged and pestiferous streets have already, after only ten days' work, been drained. Another gang of seven men, with carts, is constantly engaged in destroying mosquito larvæ in private houses, and in carrying away tin cans, broken bottles, old buckets, &c., in which they breed. They clear about forty houses daily, and carry away about ten cartloads of old pots every day, of which about one-third formerly bred mosquitoes. I am reserving my full resources for cleaning the drying streams at the end of the rains. Labour is sufficient for the present. To-morrow I start by ss. Jebba for the Gold Coast, to arrange for similar campaign there. Dr. Logan Taylor remains here. Health of both perfect."

#### EXAMINATION PAPERS FOR THE CERTI-FICATE OF THE LONDON SCHOOL OF TROPICAL MEDICINE.

SIXTH SESSION.

July 15, 1901.—10 a.m. to 1 p.m.

PAPER No. 1.

(1) Given a case of Quotidian Intermittent Fever in a patient from a malarial country, what are the points to be considered in making a diagnosis?

(2) Describe the clinical symptoms of Tropical Enteric Fever as regards their differences from

Enteric Fever of cold climates.

(3) What are the chief clinical features of Nodular Leprosy and of Nerve Leprosy? also state how you would diagnose nodular leprosy from lupus, and nerve leprosy from leucodermia.

(4) In an outbreak of Cholera a number of tanks

are suspected. How would you ascertain which of these were infected with cholera micro-organisms? When ascertained, what precautions would you take to prevent the water from infected tanks being used?

(5) Describe a Pterygium, its mode of formation

and treatment.

(6) Discuss the ætiology of Yellow Fever.

(7) Describe the most characteristic cultures of the

Plague Bacillus.

(8) What are the pathological changes in the epidermis characteristic of Eczema and Psoriasis? Outline a scheme of treatment for a case of Acute Erythematous Eczema of the face.

## July 15, 1901.—2 p.m. to 4 p.m.

PAPER No. 2.

(1) Can immunity as regards the Malarial Parasite be acquired? If so, what evidence can be adduced for this conclusion? Give examples from comparative pathology of similar immunity in respect to protozoal diseases in the lower animals.

(2) State what you know of the conditions under which Pus is found in, or in the neighbourhood of, the Liver. What measures would you undertake for

the relief of the patient?

(3) Describe the operation for Elephantiasis of the Scrotum.

(4) What do you mean by "Acclimatisation"?

(5) Describe, stating the diagnostic differences, the eggs of the Human Intestinal Parasites and the Filarial Embryos found in Human Blood.

# Practical Examination. July 16, 1901.—10 a.m. to 5 p.m.

(1) Stain and examine dried blood films A, B, and C, with special reference to any evidence of malaria. Note all abnormalities met with.

(2) Name twelve specimens under the microscope.
(3) Make dissections from three mosquitoes to show the stomach and salivary glands in a condition

suitable for examination for Malarial Parasites.
(4) Examine the specimen of fæces, D, for ova of

entozoa. State what you find.

(5) Examine broth culture E with a view to a tentative diagnosis. What further steps would you take to confirm your diagnosis?

(6) Examine and report on a case in the wards. Give your diagnosis, prognosis, and treatment of the

case.

- (7) What do the six cultures in the rack demonstrate? What conclusions would you draw as to the nature of the organisms?
  - A, Benign Tertian Parasites.

B, Pernicious Anæmia.

- C, Mixed Infectious Malaria, Quartan, and Crescents.
- D, Fæces contain ova of Anchylostoma, Trico-cephalus, and Lumbricus.

E, Broth Culture, Bacillus Phleri (Timothy Grass).

## Rebiews.

PRECAUTIONS AND SUGGESTIONS FOR THE PREVENTION AND CHECK OF CHOLERA, based chiefly on Professor Hankin's book, "Cholera in Indian Cantonments." By Colonel Joshua Duke, I.M.S. Officer, P.M.O., P.F.F.

This pamphlet of six pages is a veritable mine of gold as regards the prevention of cholera in cantonments, and the thanks of India are due to the author for the trouble he has taken in compiling it. Times are indeed changed in that country as regards the means of meeting the disease; with a more scientific view of its etiology, we can now hope to prevent its ravages. That old fetish, "the climate and other cause" theory has, we trust, been finally pulverised, and will never raise its dishonoured head again. Colonel Duke begins by relating in clear language how to deal with the cholera microbe—the fons et origo mali. It can with the greatest ease be destroyed by antiseptics or long exposure to sunlight, boiling, or drying.

In waters aërated by carbonic acid, it cannot live. Hence soldiers should be encouraged to drink aërated

waters in cholera times.

The treatment of cook-houses, wells, mussacks, earthern vessels and drinking vessels, is minutely described; more especially useful will be found the directions to be employed in mess and other cook houses.

This little work—a treatise in a nutshell—should be in the hands of every medical officer in India. We congratulate Colonel Duke on the care he has taken in its production. The directions, if followed out, will without doubt be the means of saving many lives.

## Acws and Notes.

PLAGUE AND CHOLERA.—During the year 1900, plague caused 38,412 deaths in India. The death rate from cholera during 1900 was, however, higher than in any previous year of which we have reliable records; the actual deaths from cholera during the year numbering 345,871. Yet we heard but little of cholera and its ravages at the time, although cholera deaths in proportion to plague deaths were almost nine to one.

RATS ON SHIPS AND PLAGUE.—Allowing that rats are the plague distributors we assume them to be, it is surely time that the rats on board ships were dealt with systematically. It is impossible to exterminate rats on a ship full of cargo, but in an empty vessel the process of extermination is neither very expensive nor difficult. There is always danger of rats reaching the ship from the quay along gangways, chains, ropes, &c., or being carried on board with cargo. When, moreover, plague is known to prevail in a port of call, the vessel should not be placed alongside the quay, but at some little distance from the shore, so that rats have less opportunity of reaching the ship.

In the same way, no vessel from an infected port should be permitted to draw up alongside a wharf, but should anchor in the stream.

RESULTS OF CONSUMING FRUITS AND VEGETABLES AT THE SAME MEAL. — In the Gazette des Hôpitaux, Dr. Baroux broaches a subject which opens up a wide field for investigation, and from which useful lessons in dietetics may possibly ensue. When vegetables containing oxalate of potash, such as spinach or tomatoes, are eaten at a meal and followed by sour cherries, or an orange, &c., the citric acid in the fruit is sufficiently potent to set free oxalic acid from the oxalate of potash in the vegetables; the free oxalic acid is calculated to injure the mucous membrane of the stomach, with the result that discomfort or pain may ensue in the epigastric region, even vomiting or colicky pains may result, and other symptoms indicative of slight poisoning.

These examples might be multiplied. Thus, tomato soup followed by pheasant sprinkled with lemon juice contains salts which are chemically insalubrious articles of diet. The matter is well worth looking more deeply into. In this direction may be explained how an apple is believed to be, and not only believed to be but is, more easily digested before noon than after. Is it because vegetables do not form part of an English breakfast? It is doubtful, however, if the malic acid in apples is sufficiently potent to set free any vegetable acid from its alkaline base, yet it is a fact that apples and other fruits are less digestible during the afternoon and evening than in the morning, and it may be that the previous ingestion of or abstention from vegetables may determine the digestibility. Acetic acid, according to Dr. Baroux, does not decompose the oxalates, so that we may still continue to take vinegar with our tomatoes and salads. It is suggestive, however, of damage from free oxalic acid when vinegar is used, that oil and often an egg are almost invariably taken with it in salads, the antidotes as it were, or rather the agents administered when corrosives of any kind gain entrance to the stomach. The oil is stated to be taken to prevent indigestion from the eating of salad; this may be so, and it may be that it is by counteracting the oxalic acid set free that the indigestion is thwarted.

## Correspondence.

To the Editor of the Journal of Tropical Medicine.

DEAR SIR,—I beg to hand you the photograph of a case which might interest you very much. The photograph represents a rather extraordinary case of "Elephantiasis Scroti." The victim, a Malay, has been, I am told, successfully operated upon in the hospital at Kotaradja, Atchen, or as the Dutch prefer to call it, Atjehen. The swelling, which had the enormous weight of 33 kilograms, extended so far down the legs, as the photograph shows, that the poor man had to stand, and to propel himself was obliged to keep his legs spread out, and no doubt his sufferings were enormous. The photograph has been received by me through my friend Mr. Gustave Kugelmann, who has been residing in Atchen for twenty-five years. If you think this short note would

be of sufficient interest to the readers of the Journal of Tropical Medicine, I place the material at your disposal, I am, dear Sir,

Cambridge Street, Hyde Park, London. Yours, &c., HENRY WALLACH.

## Bemedies.

## FOR DYSENTERY.

R. Pulv. Ipecac. Co. ... grs. v.
Sulphur Sublimat. ... grs. xx.
Given in powder every 4 hours. The quantity to be lessened as the stools diminish in frequency.

FOR CHRONIC DIARRHŒA.

(1) Drachm doses of castor oil every morning.(2) Ten minims of castor oil to one of tineture of opium in capsule thrice daily.

## Current Miterature.

### THE CHIGOE IN AFRICA.

AT one of our recent demonstrations some specimens of the cyst-like formations caused by the "Jigger flea" were shown. They were from Pemba (Zanzibar), and had been brought over by a lady missionary (Miss Emily Hutchinson), who had trained herself to expertness in their extraction. They look like little fibrous bags about as big as peas, and are placed immediately under a layer of epidermis. Their extraction is to be effected much in the same way that the buttons of molluscum contagiosum are removed. The epidermis must be freely cut through all round the circumference of the little cyst, and the latter must then be most carefully taken out. It is very important to remove it whole, as if any part is left, a troublesome sore may result. The cyst consists of the female probably dead - and her eggs, and if any of the latter are left to hatch, much pain and disability Our informant stated that the disease will ensue. is now very common in Pemba, and that a not unimportant part of mission work consists in teaching the natives how to deal with it. The occasion elicited from Sir William Kynsey the information that the Jigger is not as yet known in Ceylon. It is a curious fact in the natural history of this insect, that it is believed to be of recent importation into Africaits native home being South America. In Africa, however, it has spread so rapidly that it has become a very serious plague. Sir Henry Colville, in a recent article on Uganda, speaks of it "as perhaps the greatest curse of the country, though (if care be taken) a minor one"; and adds that "it has maimed whole populations." After saying that a man tried before him for the murder of his wife admitted the fact, but alleged in excuse that she was terribly infested with Jiggers, he concludes his statements by a doleful foreboding: - "I have no wish to be a prophet of evil, but it seems to me very probable that the

Jigger will be the curse of Africa. Having made his way half across the continent, I can see no reason why he should not overrun the whole of it, unless science can find some means of stopping his progress.'

At the time when Sir Henry wrote the Chigoe had reached Uganda, which, as a glance at the map (see Unyoro, lat. 1° N.) will show, is almost in the middle of the continent. Since then, as our specimens prove, the flea has fulfilled his prophecy, and reached the

Since writing the above, we have been favoured by Dr. Moffat (a grandson of the missionary) with the following particulars as to the Jigger in Uganda. Dr. Moffat had resided in that country as principal medical officer for some years. The Jigger had, he said, not been known until recent years. It had travelled across the continent from West to East, and Emin Pasha's expedition was credited with having completed its line of communication. Dr. Moffat told us that he had known many instances in which digits had been lost by the inflammation caused, and in some instances even an entire foot. It is not by any means confined to the human skin, but may live, and probably breed, in sand and in floors of houses. In such situations it often exists in countless numbers. It multiplies with marvellous rapidity and travels fast. It exactly resembles a small flea, and can jump like one. In penetrating the skin it causes no pain or irritation, but a few hours after it has embedded itself, intolerable itching attended by burning pain is caused. Dr. Moffat is of opinion that in Uganda the Jiggers are becoming already less virulent in their effects than they were when first introduced. He did not know of any remedy by which they might be killed, and held that prompt extraction was the only measure. Various substances might be used to smear the hands and feet to prevent its attacks.

As yet the Jigger has not reached Madagascar or India, nor, we believe, Arabia. It is, however, much to be feared that we shall soon hear of it in all these Since its chief means of transit is in the human skin or clothing, we have another instance of the dangers, as regards the propagation of disease, which modern facilities for locomotion entail. Although, after all, only a flea, its effects are, as we have stated above, sufficiently serious to make the study of the means for its exclusion well worthy the careful attention of medical observers.—Polyclinic, August, 1901.

## MALARIA.

PROPHYLAXIS AS RELATED TO MILITARY HYGIENE. -G. Delogu, in the Gazetta degli Ospedali e delle Cliniche, June 9th, 1901, recommends that when malaria occurs amongst soldiers in camp the patients ought to be isolated and protected against mosquitoes. On the march long gloves to cover the hands and wrists, and horsehair masks over the face and neck should be worn to protect the soldiers from the anopheles. Barracks, tents and latrines should be screened, and especially at nights should tents be closed and the beds provided with mosquito nets. Manœuvres should be held not later than the middle of May, i.e., before mosquitoes abound.

#### EXCHANGES.

Annali di Medicina Navale.

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# The Journal of Tropical Medicine.

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## Original Communications.

ON UNDESCRIBED HÆMATOZOA OF MALARIA IN THE MALAY PENINSULA; AND ON BLOOD - PLATES AS TRUE HÆMATO-BLASTS.

> By W. LEONARD BRADDON, F.R C.S. State Surgeon, Negri Sembilan.

#### PART I.

In the Malay Peninsula probably all the hæmamæbæ known in man occur. I have not met with the quartan, but have identified the large simple tertian, the small pigmented, "malignant" or "tropical" tertian, and the small unpigmented quotidian forms, none of which there is any difficulty in demonstrating, whether in the fresh blood or by staining fixed specimens.

But by far the most frequent hæmatozoon met with presents appearances which are shared by none of these, and to which none of the published descriptions of any of the known blood-parasites bear indeed

any resemblance.

The appearance of this parasite, as commonly seen at intermediate stages of its growth, is that of a delicate, irregularly branched and knotted net-work of filaments spread throughout the corpuscle. The aspect of a disc so infected when stained with methylene blue is that of a substance through which the mycelium of some fungus ramifies. When decolourised the absolutely white discs, upon which the sharply cut but irregular and extraordinarily fine filaments of the parasite appear in sharp relief, afford a picture which may be compared to the shadowcontoured face of the full moon, to marble, or, to employ a more homely simile, to a blue-veined cheese; or the innumerably knotted slender and irregular branches of the parasite may be perhaps more aptly compared to seaweed. There never appears to be any more solid gelatinous or amœba-like portion, and no part of the parasite ever presents the rounded

appearance characteristic of forms hitherto described.

At first sight the net-work appears immobile. Even on careful inspection movement is not obvious, and, if apparent, apt to be ascribed to alterations of focus, or change in the corpuscles' position. branches are, however, in constant motion; a rapid undulatory motion seems to pervade every part of every filament, so that portions of the network approach and recede out of focus, and bend and stretch, moving continually throughout the corpuscles, so that from movement to movement the picture becomes entirely changed. The actual motion of any particular part is not easy to follow, yet occurs so quickly that conviction of its actuality only dawns upon the observer as a result of noting the changed aspect of the whole. This feature makes the comparison to seaweed still more apt, nothing more resembling the movement of these filaments than the irregular changes in form of a mass of fucus swaying in disturbed waters.

As a short name where a distinctive one seems necessary, and as to some degree descriptive, I have called these parasites "mycoid."

In the earliest stages which I have noticed the parasite appears as a small deep-staining particle upon or within the very periphery of the red disc. This speedily grows, branching irregularly until the most advanced forms fill the whole of the corpuscle with a dotted ramification of interlaced filaments. Owing to the delicacy of the filaments and their constant motion, it is difficult to ascertain their more intimate structure. They are of course cyanophil, to use the word which Simon', following Laveran, considers preferable to chromatophil, but whether composed of true chromatin (or karyoplasmic substance) I have not determined. The dotted nodes or knots appear to be at the points of branching; and although this again is not easy to settle, in the maturer forms at least they would seem to be finely

Annales de l'Institut Pasteur, May 25, 1901, p. 322.

pigmented. Quantities of pigment are to be observed in the leucocytes and the plasma in these cases, but in the parasite as observed in the living blood, the deep-staining precludes any certainty of observation; but it seems certain that coarse granules, such as characterise the known tertians, do not occur.

Of the further extra-corpuscular stages of this hæmatozoon I can at present give no particulars. But at all times during the course of an infection some, and after the fastigium of the febrile attack great numbers, are to be observed free in the plasma. They appear varying in size from small irregularly shaped short branched threads or rods, often resembling cocci, diplococci, or bacilli, undergoing some unusual involution, up to spread-out branching masses many times too large to find room in a single corpuscle. It is from single corpuscles, however, in which their growth has been so great as to cause their rupture, that these masses are probably shed. In the plasma they exhibit a mode and degree of motility similar to that which they do within the disc. It was probably these bodies, which closely agree with their description, that formed the flora found in the blood of beri-berics by Pekelharing and Winkler.

After the fastigium there are to be found in the blood of many cases, in great numbers, bodies, between which and the gametes of other hæmatozoa some resemblance may be traced. I have figured several forms of these bodies, one of which would appear to be flagellating, but at present I am not in a position to affirm anything more concerning them.

It may be added that it is not usual to find all the examples of the sea-weed parasites at the same stage of growth at one time. On the contrary, every degree of size and maturity are generally to be seen simultaneously. In many specimens they are so numerous that nearly every corpuscle has appeared to be infected.

Of the clinical relations of the parasite to the fever which it causes, I need only say here that the severity of the latter, and especially the resultant anæmia, have seemed to be in direct proportion to the numerical extent of the invasion. I have been unable to detect in the course of the disease any periodicity other than quotidian. The paroxysms come on as do those of other malarial fevers, usually in the fore-noon, and last about the same time. There is no sharp crisis and rarely marked division into the three classical stages. The general symptoms and course of each attack otherwise closely resemble the other malarial fevers, and like them are amenable to quinine. The disease, as a whole, has seemed to be one of a single infection, the effects of which, unless cut short by treatment, endure normally, and on an average about six days. There then follows an interval of about a week free of symptom, to be succeeded by a second attack similar to but milder than the first.

There then appears to be established what has been termed "immunity," but should more properly be called toleration, for a long period of time. The presence of this parasite in the blood in scanty numbers often coincides with slight attacks described as "liver," and other mild indispositions unaccompanied by fevers and usually cured at once by quinine.

As regards the frequency of occurrence of this as compared with other parasites, I give an analysis of the last 163 cases of severe fever which have been treated in the Seremban General Hospital, in which the form of infection has been carefully noted.

FORM OF PARASITE.		
	No. of	7 0
Single Infections.		
Small unpigmented (malignant quotidian) ring	and	
other forms only		
Small pigmented ring and other (malignant ter	tian)	
forms with crescents only		
Small and large unpigmented "mycoid" forms		
Small and large unpigmented inycold forms	• •	
Mixed Infections.		
Small pigmented (malignant tertian) and "myce	oid"	
forms		
Large pigmented (simple tertian) and "mycoid"		
	-	-
		1
		_

Of many of the cases the responsibility for the diagnosis rests with my assistant, Mr. J. V. Schelkis, who is, however, a careful observer, but the record may be taken as showing pretty correctly the great preponderance of the "mycoid" infections over the others. In 152 cases out of 163 this form was certainly present, and in 98 was present alone.

Upon the clinical aspect of this fever and its therapeusis I hope to be able to offer more extended

observations in a future paper.

The technique required to demonstrate the parasite, and employed also for the observations described in the second part of this paper, may be noted here.

By none of the fixing and staining methods usually employed for the described hæmatozoa have I been able to demonstrate successfully the "mycoid" form. This is best shown by the method of "vital staining," practised as follows: The finger is first pricked, then wiped; on the spot is placed a drop of staining solution (distilled water containing potass. cit., 1 per cent., methylene blue ½ to 2 per cent.), into which the drop of blood is squeezed. This is then allowed to flow by capillary attraction between a sterilised slip and slide already prepared. A small portion only of the drop is allowed to enter, so that it spreads out into a very thin layer. The edges of the slip are then sealed with vaseline.

In such a preparation the discs will for the most part preserve their form for at least forty-eight hours

and can be examined at leisure.

This process is not only the best but the easiest and most rapid method of obtaining a blood film under all the conditions required for careful examination, and above all, for immediate diagnosis. For within five minutes and earlier, if stronger solutions of blue be employed, the leucocytes and all intracorpuscular nuclei and hæmatozoa become stained and conspicuous.1

I cannot too strongly recommend this process to all

When I brought this method to notice in an earlier number (Vol. iii., p. 110) of this Journal, I was not aware that it had been used by others. But Hayem describes it in his treatise du Sang as employed by himself long ago, and recommends it also as the best way of observing corpuscles without exposing them to exposure or pressure (Hayem, du Sang, 1882, p. 85). Hayem's method did not include the solution which I use,

who wish to frequently and rapidly submit the blood to examination for parasites. As will be seen from the illustrations given, all forms of parasite stain equally well, while the absorption of the blue by them does not apparently in any way interfere with their activity. Indeed I have observed in the sporing forms of malignant tertian the pigment dancing continue for three days after exposure to the stain. In this case the spores were obtained from the cancellous tissue of the bone and spleen twenty-four hours after.

The stronger the proportion of blue the more rapidly does the stain act. Stronger solutions cause expulsion of the hæmoglobin from the corpuscles, which is rather an advantage than otherwise, as they still retain their form perfectly while the endoglobular parasites retain their place and appear in no wise

injured.

In such clear discs the "mycoid" parasites are exhibited in great beauty and continue their movements, so long as the corpuscle resists disintegration, which it may do for as long as three days. The parasites frequently appear in the plasma in all shapes and sizes after the blood is thus healed, some of them no doubt derived from the breaking up of corpuscles, but others, chiefly smaller forms, are seen in great numbers, and under conditions of control which leave no doubt that they are really naturally free in the plasma.

As mentioned above, I have found no really good way of obtaining permanent stained preparations of this parasite, though the following method is fairly successful. A large drop of blood prepared as described is placed on slide or cover slip and left as a hanging drop, in a small chamber provided with moisture. Simple methods of effecting this are, either to place the cover-slip on a ring already fixed, in the space at the bottom of which is some water, the upper edge of the ring being vaselined; or to cut a disc out of a slip of wetted blotting paper. Place the latter so as to lie on the slide and surround the drop, and thereon to put the ring, which is then covered with more wet blotting paper, upon which is placed another slide, for pressure. After ten minutes the drop is made to flow slowly over the slide in a thin layer, which is then allowed to dry and may be examined. The specimen is best mounted dry, fixa-

tion by heat or alcohol spoils the specimens.

In blood films, fixed and stained by ordinary methods, it is seldom that the parasite is to be seen satisfactorily. As a rule, owing apparently to the retraction of its fine filaments only, a shapeless mass of irregular contour is to be seen, which stains not nearly so well as do other described parasites. Want of sustained leisure, as well as of experience, has prevented me from elaborating any better technique for

permanent preparations.

It is to be added that the "mycoid," or sea-weed parasite is practically undistinguishable in fresh, or dried, unstained films. Even in specimens in which I knew them to be present in nearly every corpuscle I have found the greatest difficulty in determining their presence without a stain. It may be owing to this and to the fact that the examination of dried, fixed and stained specimens has all the vogue that the

form which I have described has not been recognised

As my paper is headed Hæmatozoa, I may record here a single observation of a vermicular form, resembling that which Dr. Simon has described from a tortoise as Hæmogregarina Mesnili. This parasite was seen in several corpuscles in one case only, of which I subsequently lost sight. As drawn at the time its measurements were 1 to  $1\frac{1}{2} \mu$ , by about 12  $\mu$ , and its movements within the disc were extremely active, resembling coiling and uncoiling in loops and figures of eight very rapidly. It was observed unstained and showed no pigment. I have once observed also in the blood of a Tamil, groups of what were apparently segment products or merozoites of some gregarine resembling those noted by Captain Cornwall, but larger.

#### THE ANTI-MALARIAL CAMPAIGN IN WEST AFRICA.

By A. H. HANLEY, F.R.C.S.I., &c. D.M.O., Southern Nigeria.

Whilst in Edinburgh last week I read in the Scotsman of September 6th, a letter from Major Ross to Mr. Alfred Jones. Without in any way questioning the admirable work Major Ross has done and is doing in West Africa, I must take exception to at least one part of his letter. He states that the unhealthiness of the climate has been exaggerated. Government, as well as the traders' returns hardly bear out this statement. My personal opinion, after sixteen years experience of West Africa, during ten of which I have not been from sickness a day off duty, and therefore am in no way prejudiced, is that the unhealthiness is in no way exaggerated. A physical and mental deterioration takes place in a large percentage of the European residents, such deterioration being more marked in some than in others. This deterioration presents itself in the form of anæmia, muscular weakness, nervous exhaustion; or you get so enervated that it is with difficulty you perform your daily work. Microscopic examination of the blood of people in this state invariably gives a negative result as far as the plasmodum malariæ is concerned. I believe that if in addition to improved sanitation and and destruction of Anopheles we could improve our present diet of lean goat, fowls, and tinned or locally grown vegetables, there would be better health.

This has frequently been brought home to me by observing men who are unable to partake of our ordinary diet are at once tempted by the English meat and vegetables we occasionally get from a steamer. A system of ice boxes from home might be easily arranged for if our steamers had larger refrigerators. I am frequently asked what is a person to do in order to keep good health on the coast? and my invariable reply is take plenty of exercise, quinine twice a week, and do not allow your bowels to become constipated. I have for years advised the use of a mosquito curtain

<sup>2</sup> Indian Medical Gazette, April, 1901.

Annales de l'Institut Pasteur, May 25, 1901.

at night. Before Major Ross made his great discovery I was under the impression that the curtain merely acted as a filter for the moist-ladened atmosphere. That the Anopheles are the cause of a great deal of ill-health in West Africa is now beyond doubt, and I believe future investigations will bring to light other causes besides the Anopheles to account for the high mortality and invaliding that at presents exists. I have been greatly struck by the scarcity of malariainfected Anopheles as compared with the number of malaria-infected children. Out of 145 Anopheles caught in the vicinity of a native town in which 80 per cent. of the children whose blood was examined contained malaria I was only able to find one infected. Anopheles caught in the room of a European down with fever invariably gave negative results. I may, in conclusion, add that I consider that the greatest credit is due to the members of the various scientific expeditions who have volunteered to go to West Africa and do everything in their power to improve the health of those whose lot it is to reside on the coast.

## British Medical Association.

## A DISCUSSION ON STONE IN THE TROPICS.

By P. Johnston Freyer, M.A., M.D., M.CH.R.U.I. Surgeon St. Peter's Hospital for Stone, London; Surgeon-Lieutenant-Colonel Bengal Army (retired).

In dealing with this subject I propose chiefly to draw attention to the surgical methods of treatment for urinary calculi, and to the results obtained by the introduction of litholapaxy into India. Before doing so, however, it may be well to refer to the distribution of stone in India for the purpose of elucidating the cause of the ailment. I do not of course refer to phosphatic calculi, for the origin of stones of this group are due to catarrh or irritation of the bladder or other portions of the urinary tract. It may, however, be mentioned in passing that calculi of this nature are less frequent in India than in England, possibly because in India prostatic diseases are less common than in England. The native of India does not come to the surgeon for treatment of prostatic ailments, and "catheter life" is unknown to him. He consequently dies of his complaint at an early period of the disease, and the calculi dependent upon the condition are either unformed, or, if present, of small dimensions. What may be termed the "systemic" varieties of stone, namely, oxalate of lime and uric acid, are very prevalent in some parts of

The geographical distribution of stone in India is practically confined to the provinces in the North-West. In the Punjab, the North-West Provinces, in Scinde and Gujerat, stone prevails to a marked extent, and the dwellers in Hyderabad, Scinde, are perhaps more afflicted with urinary calculi than in any other portion of the globe. In dealing with the etiology I would draw attention to the following points:-

(1) The geological formation in the stone tract. Although the countries mentioned consist of a huge alluvial plane, watered by the Indus and the upper

reaches of the Ganges, the waters of these rivers are impregnated with cretaceous materials. taries of the Indus and Ganges have their origin in, and pass through, mountainous districts in which limestone is the characteristic geological feature. The drinking water therefore supplied in countries in the stone tracts is highly impregnated with lime salts, causing dyspepsia, and a consequent lowering of the system and digestive powers. In Eastern Bengal stone is almost unknown, because the calcareous geological formation ceases at Oudh, and the dwellers on the banks of the lower reaches of the Ganges, being free from drinking water impregnated with lime salts, are therefore free from urinary calculi.

(2) Meteorological conditions, also, would seem to directly affect the formation of stone. In the regions referred to as being extremely prone to stone the winters are extremely cold and the summers excessively hot. The profuse and continued perspiration occurring during the hot weather causes concentration of the urine so pronounced that the urinary salts cannot be held in solution, and so they drop out, crystallise, and deposit as calculi. The cold of winter upsets the digestive organs, their functions are interfered with, and the chemical salts, finding their exit by the kidney, are in excess.

(3) Diet would appear also to exercise a determining factor in the formation of stone. Sir William Roberts had stated that stone in India was due to the eating of rice. This statement is, however, quite erroneous, as in the countries where stone prevailed rice was but little eaten. Wheat, barley, and other cereals are consumed in the stone tracts of India to a greater degree than rice, and this factor in diet may be of importance in the etiology of the complaint. The eating of flesh does not explain the tendency to develop stone, as the Mahommedans, who are flesh eaters, are exempt practically from stone when dwelling in Eastern Bengal, but are seriously afflicted when

residing in the stone-developing countries.

The surgical aspect of the treatment of vesical calculi has been revolutionised since Bigelow in 1878 introduced litholapaxy. The operation was at first severely criticised by Sir Henry Thompson, who was responsible for the practice of lithotrity, or the crushing of calculi at several sittings. In 1885 I reported 111 cases of stone treated by litholapaxy in India, and since then I have practised this operation to the exclusion of lithotrity and lithotomy. In 1884 Lieut.-Col. Keegan advocated litholapaxy as a mode of treatment for stone in children; and, although at first I was opposed to the measure, I have since become a firm convert to Keegan's plan of treatment. statistics in connection with the treatment of stone in India were published, the results being:-

Of 147 patients operated upon by suprapubic lithotomy 42·17 per cent. died.

Of 7,000 patients operated upon by perineal lithotomy 11 per cent. died.

Of 10,079 patients operated upon by litholapaxy

These figures speak for themselves, and when the time the patients were kept in bed or in hospital is considered, litholapaxy still more strongly recommends Patients operated on by litholapaxy were laid up for from five to six days.

Patients operated on by perineal lithotomy for from three to four weeks.

Patients operated on by suprapubic lithotomy even

The argument that natives of India stand operations better than Europeans either at home or abroad is altogether a fallacy. The excellent results obtained from surgical operations in India in general, and for stone in particular, is not to be explained in this way. The native of India suffers from kidney disease to an extent but little, if at all, less than do Europeans.

Natives of India age more quickly than do Europeans, and stone developes at an earlier age in adults. The calculi in India are, as a rule, larger than those met with in Europe, simply because the European comes at an early period of the disease for treatment. Nowadays the size of calculi obtained at operation is decreasing in India, because owing to the introduction of litholapaxy, and doing away with cutting operations, the natives of India are coming earlier for treatment. It was a mistake to think that prostatic enlargement was less common in India than in Europe; it is simply because the native does not understand "catheter life," and dies speedily of the renal complications induced by the prostatic hypertrophy.

# DUST AS A VEHICLE FOR THE GERM OF CEREBRO-SPINAL FEVER.

By Major W. J. Buchanan, B.A., M.B., D.P.H., I.M.S. Superintendent, Central Prison, Bhagalpur, Bengal.

In an article published in the Journal of Hygiene in April last (No. 2, p. 214), I made a contribution to the little known subject of the etiology of cerebro-spinal fever, based on an examination of the forms of labour from which prisoners attacked with this disease came during a long series of cases of this disease in the

Central Prison, Bhagalpur.

In that paper I referred to forty-seven cases of epidemic cerebro-spinal meningitis, and I have now to add thirteen more, making sixty in all, and will briefly rehearse the evidence which exists in favour of looking upon dust as a vehicle for the specific organism of this fatal disease. For details, which may be here omitted, those interested may refer to the former article in the *Journal of Hygiene*. I may premise that I have been unable to trace the original source of the infection in this gaol.

The arguments in favour of dust being considered a vehicle for the germ of this disease may here be

briefly given :-

(1) The organism of this disease in India has been repeatedly shown to be the diplococcus intracellularis of Weichselbaum, thus proving its identity with the disease as known on the Continent and in America.

(2) This organism has been shown by Jaeger and Germano¹ to be capable of offering considerable resistance to desiccation. Jaeger found the diplococcus in a handkerchief six weeks after being used by a patient suffering from cerebro-spinal fever. Germano made cultures of the diplococcus, and kept it alive, mixed with dust, for eighty to ninety days; and he concluded that this diplococcus is one of the "most

resistant of non-sporogenic bacteria," and that it may well cause infection while floating in the air as dust (Nuttall). In other experiments Councilman<sup>2</sup> found that the organisms were alive after sixty hours' desiccation, but not after seventy-two hours.

(3) Acting upon Germano's statement as to the resisting powers of this organism, I examined the records of all cases which had occurred in this prison for the past four years, and found that of sixty cases from January, 1897, till June, 1901, no fewer than fifty-seven came from forms of labour in which they were constantly and much exposed to dust, whereas only three cases came from a majority of the prisoners who worked in buildings and on forms of labour where they were but little exposed to dust, as may be seen from the following table:—

Occupations with Exposure to Dust	Cases	Indoor Occupations without Exposure to Dust	Cases	
Public works and roof repairing gangs	5 11 4 2 2 10 4 8 3 7	Factory weaver Factory store-room	2 1	
Total	57	Total	3	

The so-called "dusty" occupations only furnished labour for a minority of the inhabitants of the prison, yet almost all the cases of this disease came from this

minority.

(4) Again, the monthly distribution of the cases is in favour of a dustborne origin. The most dusty months in India are those of the dry hot weather and of the dry cold weather; in the rainy season, from the middle of June to the end of September, air-borne dust is at its minimum. The cases occurred as follows:—

The dry hot months (March, April, May)... 37 cases The cold dry months (October to February) 19, The rainy season (June to September) ... 4, This shows at once the difference between the dry dusty months and the rainy non-dusty months.

(5) Moreover, the few cases which did occur in the rainy months also support this theory, for these cases came all from forms of grain cleaning, where the dust is just as great at one time of the year as at another.

(6) I had compiled elaborate tables in an endeavour to trace a connection between certain barracks and cases of this fever, but though certain barracks have furnished more cases than others, yet the times of the occurrence of these cases by no means pointed to infection derived from the ward; indeed, out of twenty-two barracks in the prison cases have come from all but four, and in the different outbreaks the number of cases have come as follows:—

Outbreak 1 ... 6 wards affected
,, 2 ... 10 ,, ,,
,, 3 ... 9 ,, ,,
,, 4 ... 8 ,, ,,

<sup>1</sup> Zeitsch. f. Hyg. u. Infekt., xxvi., p. 288.

<sup>&</sup>lt;sup>2</sup> Boston Board of Health Report, 1898, p. 78.

(7) Certain wards escaped in nearly all outbreaks, for example, Nos. 1 and 2, where factory (that is, non-dusty) prisoners are confined, only had one case in over four years. The wards which produced most cases were those in which short-time prisoners were housed, and these are the men usually chosen for the non-skilled forms of labour, such as shown in the table above. The long-term prisoners who worked in the factory at weaving, spinning, and other forms of skilled labour, and were not exposed to dust, escaped from this disease.

(8) A close examination of all the associations and surroundings of the cases as they were admitted failed to discover anything pointing to direct contagion, and in no case were those in attendance on the sick

attacked.

(9) Acting upon this theory that dust, either atmospheric or that produced copiously in the various processes of husking and grain cleaning, was the vehicle for the distribution of the germ of the disease, I seven months ago took in hand a workshed from which eight cases had occurred in 1900. First I had a brick-on-edge, well-cemented floor made, the walls were then thoroughly scraped and tarred, and afterwards lime-washed, the mat-and-tile roof was renewed and thoroughly lime-washed, and the floors were regularly swept and deluged with perchloride lotion. Next taking advantage of a custom of the natives, who, when they go along a dusty road like to cover up their mouths and noses with a cloth, I had issued to each workman a piece of cloth for this purpose, and I saw that they were them while at work on the very dust-producing labour of husking rice.

So far theory, but the result proved admirable, for from a form of labour which produced eight cases in 1900 not a single case came in this year, though the occurrence of cases in the road and garden gangs showed that the germ was certainly present. I can see no reason, beyond the precautions taken, why these grain-cleaning gangs should have this year escaped.

In conclusion, I would recall the attention of medical men in the tropics to the existence of cerebro-spinal fever, which has every claim to be reckoned with as

one of the continued fevers of the tropics.

FOUR CASES OF LIVER ABSCESS TREATED BY TAPPING BY TROCAR AND CANNULA, AND SYPHON DRAINAGE (MANSON'S METHOD).

By James Cantlie, M.A., M.B.Aberd., F.R.C.S.

Surgeon, Seamen's Hospital, Albert Dock; Lecturer Applied Anatomy, Charing Cross Hospital.

RECENTLY I have had further opportunities of testing Manson's method of treating deep seated liver abscesses, namely, by tapping the abscess by a large trocar and cannula, introducing a large drainage tube stretched upon a metal rod through the cannula and applying syphon drainage to carry off the pus.

Of the four cases all operated upon within the last twelve months, three recovered and one died. The fatal case (an Indian) was, however, undertaken merely for purposes of relief, the patient being almost collapsed when admitted to the hospital. The four cases complete a series of twenty-eight cases in all I have operated upon by this method, of which twenty-four recovered. Of the four cases that died two were the first operations of the kind I attempted; a third was not under my care after the operation, having been only called in to perform the operation itself; and the fourth was the case mentioned above, in which a successful issue was well nigh an impossibility.

The operation of treating deep-seated liver abscesses by trocar and cannula, in place of by hazardous cutting methods, were fully advocated at the meeting of the British Medical Association in 1900. On that occasion Colonel MacLeod, Dr. Manson, and others, testified to the advantages accruing to this line of treatment, and none of those experienced in tropical diseases who were present dissented from the views expressed. I have become more convinced than ever of the efficacy and safety of treating liver abscesses by the trocar and cannula, and still more ready to condemn

operations by the knife.

The chief argument against the use of the trocar and cannula is that it is "unsurgical," whatever that may mean; and the advocates of the use of the knife declare any other method as being "timid" surgery; that they like to have "a good view of what they are doing," and that they like "to look their enemy in the face." These are not scientific arguments, but mere statements, and flavour of surgical braggadocio; and they are not statements that admit of scientific discussion. The unanimous opinion passed at the meeting last year was that operations as usually performed by the knife were over-heroic, that they were unnecessarily severe, and that they offered certainly no advantages in results.

My chief argument against cutting operations is that the severity of the operation in many cases is such that the opening of the abscess is apt to be deferred until too late in the disease. To cut down by way of the chest, the pleura, the diaphragm, and the peritoneum to reach a liver abscess is an ordeal that the patient, if he knows anything of the treatment contemplated, is apt to shrink from, and even the medical practitioner is willing to try every available resource before condemning his patient to so severe a line of treatment. Again, hepatic abscesses occur for the most part in tropical countries where skilled help may not be available, where trained nurses are unknown, where the appliances for surgical operations may be but few, and where, therefore, heroic operations do not commend themselves, and can only be undertaken at great risk to the patient.

What after all is demanded when pus accumulates in or around the liver? Free outlet to the pus and efficient drainage. The simplest method of obtaining this is the best, and I contend that the simplest, safest, and most ready plan is by the trocar and cannula, and the introduction of a drainage tube of sufficient size to ensure that the pus may escape without let or hindrance. The size of the tube necessary to permit of such drainage has been much exaggerated, and I believe that, with syphon drainage, the size of the tube we use after tapping by the trocar and cannula will diminish rather than increase as

time goes on and we gain more experience. The suction obtainable by syphonage is considerable, and often errs on the side of being too severe, for along a moderately small-sized tube even thick liver pus

will readily pass.

It will be noted that my arguments in favour of the trocar and cannula are in connection with deepseated liver abscesses, not abscesses which actually bulge either towards the abdominal wall or the ribs, so that the pus is close below the surface. The abscesses have in these instances been left so long that the pus has burrowed its way to the surface, and the so-called "operation for liver abscess" is merely setting free pus which had perhaps its origin in the liver, but is now a mere subcutaneous collection. To argue upon the advantages of any kind of "operation for liver abscess" in cases of this sort is a mere misnomer-it is merely letting out subcutaneous pus. In the first place the abscess should never have been allowed to advance so far that the pus actually causes the parietes to bulge. The practitioner has either failed to diagnose the case, or has from timidity hesitated to operate. There is but little excuse for any practitioner allowing pus in the liver to gain such proportions that the abscess can be felt either to bulge or to fluctuate. Therefore I debar all such advanced abscesses from being considered seriously. With abscesses allowed to attain such unjustifiable proportions, it matters not what operation is undertaken, and cutting is perhaps the better. But it is not these abscesses I am dealing with—abscesses which should never have been allowed to develop so farbut with deep-seated abscesses which do not bulge either towards the anterior abdominal wall or towards the right lower intercostal spaces. I speak of deepseated abscesses, and of these only, for they are the only collections of pus in the liver or its neighbour-hood which present any difficulty. I have previously classified liver abscesses as suprahepatic, intrahepatic, and infrahepatic or subhepatic abscesses. Of these three varieties the last is quite rare, and but four cases are on record. The suprahepatic and intrahepatic abscesses are the forms usually met with; the former, the suprahepatic variety, being met with between the layers of the suspensory (or broad) ligament of the diaphragm, and involving the liver but to a small extent; the intrahepatic variety, as its name implies, occurs within the liver substance; suprahepatic abscesses constituting the majority of liver abscess which are said to collect "at the back of the liver," and from their situation press primarily upon the diaphragm and bulge upwards towards the They are necessarily deep-seated, and to reach them either the peritoneal cavity or the pleura has to be traversed. Intrahepatic abscesses in the early stage in the stage in which they ought to be reached by operation—are necessarily also deep-seated. When the pus has bulged towards the liver surface and caused adhesive peritonitis and parietal bulging-a stage it should never have been allowed to attain unless the patient has not been under observationit is no longer deep-seated, and anyone, however unskilled in operations of the kind, can proceed to deal with it.

My contentions are :-

(1) That pus should be sought for early, the moment, in fact, that there is a suspicion of liver abscess.

(2) That it is perfectly safe, with the precautions mentioned below, to search for deep-seated pus by the

hollow needle of a syringe or an aspirator.

(3) That it is unnecessary to expose the liver before aspirating. Exposure of the liver surface when the pus is deep-seated shows nothing, adds nothing to one's knowledge of whether or not pus is present, is no guide where to put in the needle, and, if pus is found after the liver has been exposed by a laparotomy, there is greater danger of the escape of pus into the abdominal cavity than when the needle is introduced from the surface and no laparotomy performed. Colonel MacLeod related a case at the meeting of the Section of Tropical Diseases at the British Medical Association in 1900, in which a surgeon performed laparotomy in a case in which liver abscess was suspected; that, when the liver was exposed, no further steps were taken because the liver looked quite normal, yet two or three days afterwards the patient passed a quantity of liver pus by the rectum. The exposure of the liver, therefore, may prove of no diagnostic value; and its exposure frequently proves a deterrent to recovery should pus be found.

(4) Should an abscess be seen after laparotomy to bulge on the surface of the liver, it is farcical to suggest stitching it to the edges of the wound before opening. If the abscess is of even moderate dimensions and its walls thin, the first puncture of the suture needle either pricks the wall of the abscess or so thins them that pus escapes, either in quantity or, still worse, in driblets, and the surgeon is in a fix. Packing with sponges, washing out the abdominal cavity, subsequent suturing, &c., are well enough on paper, but they are not quite what the surgeon wished for or expected when he began his operation, and the precautions constitute "the best that could be done" under the circumstances, but he had rather the cir-

cumstances had not happened.

(5) It is well to disassociate the operation for hydatids and for deep-seated abscesses of the liver once and for all. The surgical steps in the former are not applicable in the case of the latter. The operations are quite distinct as the circumstances are seldom even approximately the same. Neither in their etiology, pathology, or treatment are hydatids and primary abscess of the liver identical. Hydatids no doubt suppurate, and a collection of pus, the result of a hydatid, may require special treatment, but the ordinary hydatid and the hepatic abscess are as far apart in their surgical bearings as in their etiological.

(6) To reach a liver abscess by way of the chest, removal of a part of a rib or ribs, stitching the layers of the pleura together, cutting or tearing a pathway through the diaphragm, and if the abscess is intrahepatic, opening the cavity of the peritoneum to reach it, or if suprahepatic, possibly missing it altogether, is a procedure which may occasionally be justifiable, but I have never met with a case of the kind, nor do I ever expect to. It is this operation especially which is regarded as over-heroic, and I have no hesitation in declaring against it absolutely. It is declared as being the only properly "surgical" procedure, and all who do otherwise are accused of surgical cowardice. Well, many good men, the men whose opinion I respect most in connection with this subject, are under this terrible ban, and I am content to place myself in line with them, and still consider

we are doing the best for our patient.

When a liver abscess is suspected pus ought to be sought for without delay. This is done by introducing the hollow needle of an aspirating syringe or of an aspirator into the liver. If not found at once the needle may be inserted again and again—say six or seven times or more—into the liver in different parts, or until pus is found or believed to be non-existent.

In my opinion the pus ought never to be sought for by a hollow needle unless the surgeon is prepared to operate at once should pus be found. In London hospitals, and in private practice at home and abroad, it is customary for a physician to first search for pus in his patient's liver, and then having found it, inform the surgeon that he wishes an operation performed. This is a dangerons procedure and one which no one is justified in doing. No physician ought to search for pus in the liver without a surgeon standing by ready to operate at once; or if the medical practitioner is abroad where he acts as both, he must always be prepared to follow up the finding of pus by a surgical operation. The reason for this is obvious, for were a thin walled abscess near the liver surface pricked in one or more places by a needle, the pus may quickly escape thence into the peritoneal cavity.

It is well to introduce the needle again in one or two places around the needle puncture at which pus has been found, to ascertain the lie of the abscess, so that drainage may be applied to the lowest part of it. Never introduce the same needle by which pus has been found into another part of the liver, or at least until the needle has been thoroughly cleansed.

Immediately the pus is found, and the lie of the abscess made out, incise the skin at the seat of the needle puncture for about three-quarters of an inch to admit the trocar. Plunge the trocar and cannula into the abscess, either through the chest wall, between the ribs or through the abdominal wall, maintaining the direction followed by the hollow needle. It is well when aspirating to notice the most superficial point at which pus issues whilst the needle is withdrawn, the most superficial part being the distance to which only the trocar and cannula need be introduced. Now withdraw the trocar; stop the pus as it issues through the cannula from flowing by placing the thumb over the mouth of the cannula, as it is unwise during this stage to allow the abscess to empty completely; stretch the specially prepared rubber tube, some nine inches long, with perforated ends, which I show you, on the long metal rod, and pass both through the cannula until the bottom of the abscess cavity is felt; slip the cannula out, and remove it over the stretched tube; relax the tube so that it shrinks towards the bottom of the cavity by steadying the end of the metal rod there, withdraw the rod, and leave the drainage tube in the abscess. The tube may now be stitched to the skin without the suture penetrating the lumen of the tube. Into the end of the projecting drainage tube insert a piece of glass tube of suitable size to fit the tube, and about three or four inches long. To the distal end of the glass tube fit a long piece (some four or five feet) of tubing, which serves to conduct the pus to a bucket by the side of the bed. The bucket should contain a sufficiency of antiseptic (carbolised) fluid to cover the end of the tube to the depth of several inches. A weight, or a piece of lead on a string (clip forceps will do temporarily), ought to be attached to the end of the tube to prevent it slipping from the bucket. The tube should be filled with warm boracic lotion, if the pus is not issuing freely enough to find its way into the bucket, taking care that the fluid and pus are not forced back into the abscess cavity whilst the tube is being filled. This can be prevented by grasping the tube close to the body between the finger and thumb. Now surround the tube as it issues from the side with wet antiseptic gauze, and cover by the usual dressings.

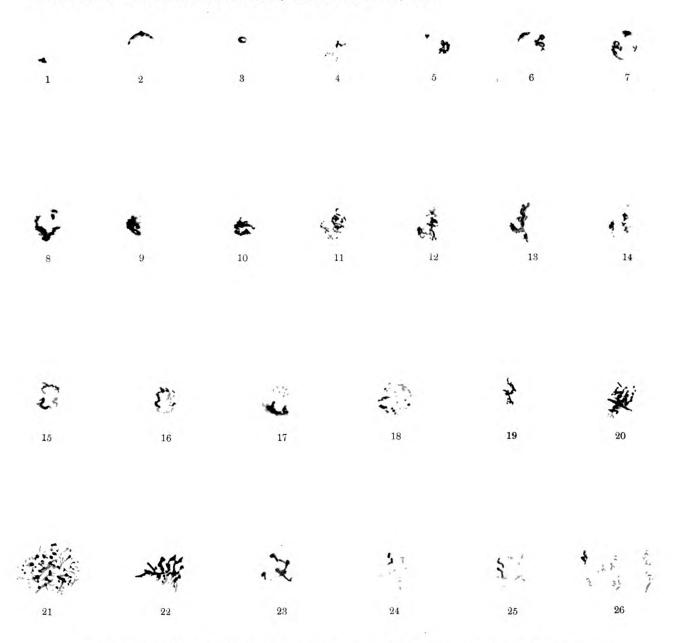
The subsequent treatment consists chiefly in watching the flow of pus. If the patient complains of a dragging pain in the region of the liver or shoulder, raise the bucket from off the floor so that the syphon drainage is less powerful. Do not attempt to wash out the tube, or the abscess cavity, unless the flow has absolutely ceased, and the temperature is going up. Let all remain unchanged except the dressings, if the temperature is satisfactory, until the fluid through the glass tubing is seen to be bile-stained, when the drainage tube may be cut off close to the body, and after a day or two a smaller and shorter tube used to replace it. The tube is gradually

shortened until the wound heals.

Case 1.—T. W., male, aged 40, marine engineer, native of England. Went to China in 1889 in perfect health and continued so until October, 1900, when he had an attack of dysentery. He remained in hospital nine weeks and made a good recovery. On March 12th, 1901, he came to England for a holiday. During the first week of April, 1901, he experienced a severe pain in his right side, which got worse day by day. He had no rigor, but felt feverish and had

occasional night sweats.

On April 25th he was admitted to the Seamen's Hospital, Albert Docks, London. On admission the patient looked sallow, anæmic, and thin, having lost about three stone in weight. He complained of pain in the right shoulder and in the right side over the region of the liver. His tongue was coated and of a yellowish tinge; appetite poor; bowels moved naturally once a day; and, on the day of admission, the temperature was 99° F. at 2 p.m., and 101.2° F. at 10 p.m. The area of liver dulness was increased in every direction, but not more than about one inch in an upward and in a downward direction. In the epigastrium the left lobe was felt to be distinctly increased in size, so much so that attention was directed towards the left lobe as being possibly the seat of the trouble. This belief, however, was dispelled after a day or two's observation, and it was recognised that the enlargement of the left lobe was but the compensatory physiological enlargement consequent upon the left lobe taking up the work left undone by the diseased right lobe. There is distinct but not severe tenderness over the liver on percussion;



To illustrate the Article (Part I.), by W. Leonard Braddon, F.R.C.S., "On Undescribed Hæmatozoa of Malaria." Page 299.

## DESCRIPTION OF PLATE.

Figs.

- 1, 2, 3.—Young forms of branching parasite in disc free of hamoglobin. x 850. W. L. B. May 5.
- 4--10.—Two or more young branched parasites in same corpuscle observed at intervals of 15 seconds. W. L. B. May 5. x 850; discs decolourised.
- 11-18.—Single parasite at intervals of 10 seconds.
- 19-22.—Free branched forms; last deeply stained after 20 minutes.
- 23-25.—Intra-corpuscles; after 20 minutes' staining.
  - 26.—Small free forms.

E. M. B. July 1. x 1200.

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when the liver is grasped between a hand placed behind and another in front acute pain is elicited in the right shoulder. Spleen is not enlarged. Urine specific gravity 10.28, rather dark in colour; no albumen, no sugar; bile pigment a trace. The patient has a slight cough and some mucous expectoration. Heart normal; pulse 84, rather feeble. The patient suffers from sleeplessness, getting only a few snatches at a time; he ascribes the sleeplessness to the pain in the shoulder.

May 1.—The patient was given an anæsthetic, and pus was found three and a half inches from the surface in the right mid-axillary line between the seventh and eighth ribs. A large trocar and cannula was at once plunged into the abscess, and a large drainage tube, stretched on a metal rod, introduced through the cannula. Pus to the amount of twenty ounces was drawn off at the time. Syphon drainage was applied and the tube stitched to the skin.

May 2.—The morning following the operation the temperature fell to 97.4° F.; in the evening the tem-

perature rose to 100° F.

May 3.—The temperature kept to the normal during the 3rd, and below the normal both morning and evening during the 4th, 5th, 6th, 7th and 8th days. The patient was now practically convalescent.

May 10.—During movement in bed the patient violently pulled in the drainage tube and it slipped out. It was found impossible to replace the tube, so an anæsthetic was given and the tube inserted.

May 26.—The patient has continued fairly well, the

temperature never rising over 100° F.

June 1.—Not so well. Congestion of base of right

lung, and some blood in expectoration.

June 3.—As the patient did not improve and dulness continued at base of right lung and an empyema was suspected, the patient was again anæsthetised, the abscess cavity explored by the finger, a counter opening made, and free drainage established.

June 5.—The discharge from liver practically nil;

but cough and expectoration continued.

June 11.—Liver abscess almost healed, but the temperature keeps up, reaching in the evening 103.6° F. Erythematous patches appeared on the inner aspect of the right forearm and the outer aspect of the right, evidently of a pyæmic nature; pulse 116; respirations 32; expectoration muco-purulent and more profuse.

June 12.—Both lungs are consolidated at the base, the right lung being affected as high as the middle of

the scapula.

June 14.—Expectoration profuse, tinged with blood. June 17.—Patient much improved, blood disappeared from the sputum, which is now mucopurulent.

June 24.—The temperature has been below and

just above normal during past week.

July 1.—An abscess of pyæmic origin evidently was opened in the right forearm to-day.

July 10.—The patient quite convalescent and about

to leave the hospital.

CASE 2.—W. W., aged 26, trooper 5th Dragoon Guards, native of England; served in India and South Africa. Whilst in India the patient had "fever" on several occasions and pneumonia, but

never had dysentery. In South Africa he arrived in good health, but during April, 1900, had an attack of "remittent fever," with diarrhæa, which lasted one month. There was no blood passed at stool, but on May 7th, 1900, whilst about to sail from Durban to England, he noticed pure blood in stools for the first time. Blood continued to be passed at stool up to August 1st, 1900. During the early part of July, 1900, pain developed under the right costal cartilages of a "shooting" character; the pain gradually increased in an upward direction, and affected the right shoulder. During July and August, and up to the time of admission to Seamen's Hospital, September 21, 1900, had regular nightly attacks of rigors, fever, and subsequent sweating, with occasional attacks of vomiting.

On admission to the Seamen's Hospital, Royal Albert Docks, on September 21st, 1900, the patient looked anæmic and thin. Digestive system: Tongue coated white; appetite good; constipated. There was pain and tenderness in epigastrium and over the liver generally. Area of liver dulness considerably increased, extending from the lower border of the fourth rib to two inches below the costal margin in the nipple line. There is hepatic fulness in epigastrium and increase of liver area. Spleen dulness not increased, but there is tenderness on pressure in the region of the spleen. Temperature 101.6° on admission. He complains greatly of pain in the right side and shoulder, and of not having slept well for a considerable time.

September 25.—The liver abscess was operated upon by Manson's method. Pus was found four inches from the surface of the chest by an aspirating syringe, and a large trocar and cannula immediately introduced, when twelve ounces of pus escaped. A large-sized drainage tube stretched on a metal rod was introduced through the cannula and the tube cut short; no syphon drainage was established at first.

October 4.—The pus flowed freely enough after the first day or two. The patient is comfortable,

temperature subnormal, and appetite good.

October 28.—A small quantity of pus only, but the tract of the abscess cavity seems very long—as much as six inches, and causing some difficulty in drainage. It is contemplated to open the cavity further back so that the pathway to the surface is shortened.

November 9.—Still difficulty in getting free escape of pus owing to length of purulent tract. Patient

unwilling to be operated on again.

November 15.—Discharge almost nil; tract healing. Patient convalescent; left hospital shortly afterwards.

Case 3.—W. B. C., aged 52, native of England. He was in excellent health when he went to South Africa in 1879. Health remained good until the month of December, 1897, when he contracted typhoid fever in Johannesburg. From the attack of typhoid he seemed to recover perfectly. Present illness dates from December, 1899. The patient was then in Durban when he was attacked by "jaundice" and "fever" with marked perspirations. His ailment was diagnosed as "catarrh of the stomach." The initial attack lasted about one week. During the following three months he had several recurrences, but none so severe as the first. The attacks described

by the patient consisted mostly of recurrent febrile attacks which occurred during the night, when he had fever, bile in the urine, and severe perspirations. On the following morning the fever and jaundice symptoms, as a rule, had disappeared, and he was able to be out and be at work. The patient left Durban on April 27th, 1900, for Pietermaritzburg, where for two months he kept quite well. In June, 1900, however, the "jaundice" and feverishness returned and the diagnosis of sorbutic jaundice was made. This, however, no doubt on account of the accompanying increase of temperature, was altered to malarial jaundice. The patient subsequently went to Grahamstown, where for nine weeks he had weekly attacks of "liver and jaundice." The attacks from the patient's description were like ague with shivering, heat, and perspirations. December, 1900, the patient came to England, during the voyage home he had no "attacks"; on arrival in London, however, he had a slight recurrence, but not of sufficient severity to prevent him going to Birmingham on the next day. Immediately on arrival in Birmingham he had attacks every second day for three weeks. He was jaundiced and confined to his room; the diagnosis made, if the patient can be believed, was that he was suffering from gall stones. During this period he lost weight rapidly, and since the commencement of his illness had lost in all about 40lb. weight; he entered a private hospital in Birmingham, where, during his five weeks' stay, he had no fever or attack of any kind. During the time he was in hospital he was on strict diet. For about five weeks after leaving hospital the patient had no fever, no jaundice, and he increased

About the end of April, 1901, pains recurred in the back and over the pit of the stomach; the pain was not acute, but dull and wearying. This attack was different to any the patient had suffered from previously. He went to hospital, but, although an operation was contemplated, it was postponed. During the period of his stay the liver became enlarged and tender, he vomited when first taken ill, and had

frequent attacks as if from ague.

When seen by me in London the patient was under the care of Dr. Rotherol. The patient was very thin, and with a jaundiced tinge of feature. Daily his temperature rose to 100° and 101° F. Breathing normal, lungs normal; pulse 80 to 95. There was no cough, but a gnawing pain persisted in the right hypochondrium. On examining the abdomen the right side of the chest wall bulged considerably, and there was subcutaneous ædema over the seventh and eighth ribs in the anterior axillary line. The liver could be made out to be enlarged slightly upwards; but there was no protrusion or dulness below the right rib cartilages. In the epigastrium the liver was but slightly tender, and occupied a normal position. The patient had been seen the day previously by a physician in consultation, who provisionally diagnosed hydatids, and advised operation.

June 16, 1901.—I came to the conclusion that the patient had a liver abscess, and, after the patient had been anæsthetised, searched for pus between the seventh and eighth ribs. Some two inches from the surface pus was found by an aspirating syringe; a large

trocar and cannula were plunged into the abscess, a drainage tube passed through the cannula into the cavity of the abscess, and syphon drainage established. The pus that escaped through the cannula squirted out with great force, showing that it was under considerable tension. The pus was of a light yellow colour, very thin, and with a slight greenish hue, indicative of long retention.

There is nothing further to record in this case except an uninterrupted recovery. On June 18th no pus was escaping by the drainage into the bucket in which the end of the drainage tube was placed, and the patient's temperature being normal, the tube was cut off short within a couple of inches of the side of

the chest.

June 29.—No pus now escapes by the small drainage tube placed in the mouth of the sinus;

and the patient is convalescent.

Case 4.—S. S., aged 50, native of Zanzibar, a coal trimmer on board ship; last voyage from Australia. Admitted to hospital after twelve days' illness; no other history obtainable. On admission, the patient was emaciated, weak, and almost in a state of collapse. The breathing was shallow; the respirations were at the rate of 40 per minute, pulse 78; temperature normal. Liver dulness increased in axillary, nipple and median lines. Epigastrium very prominent, and evidently pushed forward by the liver. On the first day of admission a large stool was passed, looking like custard, but with no fæculent matter. The patient has been maintained during the last twenty-four hours by constant feeding in small quantities by brandy.

September 3.—Pus was found by an aspirating syringe, and a large trocar was passed deeply into the abscess; about eight ounces of pus flowed; a large drainage tube was inserted, and cut off short. No amoebæ were found in the pus. During the night the patient tore off the dressings, and with them the drainage tube was removed. The drainage tube could

not be satisfactorily replaced.

September 6.—A great quantity of bile-stained pus escapes into the dressings, necessitating frequent charge. The stools are very frequent, every half hour during some part of the day. The stools still preserve their custard-like appearance.

September 7.—A large drainage tube was introduced to-day, when some twenty ounces of pus welled out of the wound. In three hours afterwards, and again after an interval of four hours, large quantities of

pus saturated the dressings.

September 8.—Great quantities of discharge still issue from and around the tube. The discharge consists of a bile-stained fluid of yellow, green, and brown hues. The patient is very weak, restless, and at times collapsed. Stools very frequently and passed unconsciously, and containing but little fæcal matter.

September 9.—For the first time amœbæ found in the pus. The patient grew gradually weaker and

died on September 12th.

Post-mortem examination.—No adhesions had formed between the liver and the abdominal wall around the seat of operation. Old adhesions were found at some distance from the seat of operation between the right lobe and the under surface of the diaphragm. No adhesions had formed between the liver and intestines.

No fluid in the peritoneal cavity nor any signs of peritonitis. In the substance of the right lobe of the liver two abscesses existed, each about the size of cricket balls, separated by a partition about one inch in thickness. The trocar and cannula had traversed this partition, and had reached the far abscess, thus accounting for several of the peculiar features in connection with the case.

Three of the cases—1, 2 and 4—were patients in the Albert Dock Branch of the Seamen's Hospital. They were all under Dr. Manson's care, and the abstracts are from the notes of the cases taken by Dr. W. G. Ross, senior resident medical officer in the hospital. Case 3 was under the care of Dr. Rotheroe, to whom I am indebted for notes of the case. All the cases, with the possible exception of No. 2, were intrahepatic Cases 1 and 4 were distinctly postdysenteric; the others gave no definite history of dysentery. In case No. 3 the attacks seem to have been of a malarial nature; and intermittent malarial hepatitis, if we can recognise such an ailment, would seem to best describe the attacks described by the patient. Case 4 was operated upon for the purpose of relief merely.

THE SPINAL CORD, PERIPHERAL NERVES, AND SKIN IN MACULO-ANESTHETIC LEPROSY.—By Oskar Woit. (Lepra, vol. i., fasc. 1 and 2, p. 50; also fasc. 3 and 4, 1900. With a plate, tab. 7, in fasc. 3.) In a series of articles in this new publication, Dr. Oskar Woit describes the condition of the spinal cord, the peripheral nerves, and the skin in maculo-anæsthetic leprosy. The author found degenerative changes in the spinal cord, but as similar processes are observed in other diseases they cannot be regarded as distinctive of leprosy.

The author's microscopical specimens were examined by Professor Schultze, of Bonn, and Professor von Shrumpell, of Erlangen, and both these authorities coincide with Dr. Woit in his opinion that the changes in the spinal cord are not specifically due to leprosy, and do not explain the signs and symptoms of maculoanæsthetic leprosy. Bacilli were never discovered in the sections

The skin filaments of the peripheral nerves were found to be degenerate; the nerves to the muscles, on the other hand, exhibiting either no degenerative, or very slight changes, thus demonstrating that the nerves to the skin were involved prior to those to the muscles, which in some cases entirely escaped. The author found ascending atrophic degeneration of the sensory nerve branches. He agrees with Hansen and Looft that atrophic changes in the nerve-fibres continues, while the acute leprous processes in the nerves may come to a standstill.

Though Woit has not personally examined the nerve ends, he concedes to Gerlach's opinion on this point. Dr. Woit, in all, examined nine macules existing in six cases of leprosy of the maculo-anæsthetic type, and only found a few bacilli in the skin of two of the lepers. The author coincides with the opinion of other investigators who state that bacilli are either entirely absent, or very rare, in the maculo-anæsthetic leprosy.

QUARANTINE AND DISINFECTION IN TURKEY.—A correspondent of the Standard, September 3rd, 1901, writes that, during the quarantine regulations under which ships are now allowed to touch at Turkish ports, disinfection has to be performed either at Touzla or Clazomene. The following experiences, related by the correspondent, gives a graphic account of the manner in which this operation is carried out in Turkey.

"We embarked on an Austrian steamer for Smyrna, and the Captain chose to undergo his disinfection at Toulza. On arriving there, we found only one big barge, containing, also, only one room, divided into two, half being considered contaminated, for receiving passengers, and the other half clean. This barge was surrounded by perhaps six hundred lighters, other barges, and native boats, waiting for clean bills. ourselves had to wait for six hours before all the passengers, officers, and crew were made to land on the barge. Here we were ushered into the first room, and were given a bundle of absolutely filthy rough cotton shirts, long enough to reach to the knees, and told to undress to the skin and put on the shirts, while our own clothes were under disinfection. The whole barge was in a state of dirt difficult to describe, and the condition of the shirts, after having been used indiscriminately by hundreds of the lowest classes of bargees, sailors, and third-class passengers of the kind which habitually travel in Turkey, may be left to imagination. Three of us Englishmen declined point blank to undress under these circumstances, and whilst one threw his quarantine shirt in the face of one of the keepers, and jumped out of the window, I burst open the door leading to the clean part of the barge, and going to the doctor, complained of the disgraceful state of the arrangements, and declared that none of us at least would consent to be disinfected there. The rest of the first-class passengers, who had seemed inclined to submit before, were at length persuaded to join in our refusal, upon which we were told that we should have to go back to Constantinople. On our stating that, if we did, we should not fail to protest most strongly, and when they saw we had no intention of yielding, the incident ended in our simply paying the usual fee of five piastres, which is levied on all who pass through this quarantine station."

This plain narration of facts forms a powerful indictment against the whole system of quarantine as practised in Turkey. Dirty linen on board ships is not touched, whilst passengers who are quite clean, and in a perfectly satisfactory sanitary condition, are made to run the risk of all sorts of abominable infectious diseases, easily transmissible from the last wearer of the loathsome common quarantine garments. The rule of exacting payment, even from the poorest, is also much to be condemned, as not only does it press hardly on many, but as it must bring in a considerable amount to those concerned, it encourages the continuance of vexatious quarantine, and leads doubtless to a slovenly performance of operations, the main object becoming at once the encashing of the piastres and not the disinfection of the victims.

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THE

## Journal of Tropical Medicine

SEPTEMBER 16, 1901.

## OMNIPRESENT MALARIAL INFECTION.

THE report we published in the last issue of this paper, Sept. 1st, 1901, on Malarial Infection as dealt with in patients in the Civil Hospital, Hong Kong, is one of the most interesting clinical facts in connection with the subject of malaria we have had brought to our knowledge. Dr. Bell, Acting Principal Medical Officer in the Government Civil Hospital, and Lieut. G. Stewart, I.M.S., examined the blood of some hundreds of patients, irrespective of their diseases, as they presented themselves at the hospital. No matter what was the complaint, the blood of the numerous patients was tested for malarial infection, and a perusal of the article affords ample food for reflection. Malarial parasites were met with in patients suffering from almost any and every disease with which we are acquainted in tropical and temperate climates. In some cases

no apparent malarial infection was observed, but they formed the minority, and it is perhaps safe to say that the absence of signs of infection, in even the small number giving negative results, The wide-spread, the was apparent merely. almost universal, infection of persons brought within the ken of these observers points to the general saturation of a community dwelling in a malarial district. The remark "that persons in a malarial region all have the disease in them, and that only a slight deviation from health is requisite to bring out the evidence of its presence," was never more fully corroborated than by the recent Hong Kong observation. circumstance opens up a large field for discussion, and although it has been present to many minds that such was the case, it has never received more ample confirmation.

It must be remembered that all the persons examined by Dr. Bell and Lieut. G. Stewart were ill from some cause or other, and it may be that many were rendered liable to contract illness because they were infested with malarial parasites. It therefore does not follow that the whole of the community have malarial parasites in their blood, as it was only the "sick" who were made the subjects of enquiry. There is no doubt that malarial infection reduces the vitality, and renders the patient less capable of resisting infection, whether of a typhoidal nature or of any of the zymotic ailments, and therefore it might be assumed that those with malarial parasites in their blood would more frequently come under the observation of the medical practitioner. To establish the general prevalence of malaria in a community, the blood of the healthy as well as of the sick persons will have to be examined, and we hope that the two men who have, at great pains and patience, given us so much, will complete their interesting work along the lines we have indicated.

If it is shown that malarial parasites are more prevalent in the blood of those who are the subjects of disease than in the healthy, we have proved to us, if indeed we wanted more proof, that malaria lays us more open to contract disorders of various kinds. If, on the other hand, the community generally—the sick and healthy alike-are equally infected, then comes the question how far malaria plays a part in the mortality of those attacked by other diseases, and how far it is necessary to fight the malarial poison let loose to do damage by the lowered vitality attendant upon zymotic or other complaints? Many problems in treatment suggest themselves, and would require larger space than can be devoted to the subject here. One potent question relates to parturition. If malarial infection is widespread, should the mother be protected from possible post-parturient fevers by the administration of quinine? Must quinine form part of the regular treatment in typhoid fever, smallpox, dysentery, and the many diseases which Dr. Bell and Lieut. G. Stewart have proved malaria to exist in? We hope medical men elsewhere will take up this question and give us their experiences founded upon observations after the manner commented upon.

It will be noted that it was not only in persons suffering from infectious diseases that the malarial parasites were discovered, but also in persons suffering from fractured bones and other traumatic ailments. There can be no connection between a broken leg and malarial poison, but the shock, the altered conditions of life consequent upon the rest entailed, &c., may be sufficient as etiological factors in giving the parasite the upper hand, by defying the beneficent action of the phagocytes. Is it, then, necessary even in cases of broken leg to administer quinine as a prophylactic precaution? The idea may seem far fetched, but in virtue of the evidence before us it would appear that the practitioner will be taking the best interest of the patient into consideration by doing so.

Dr. Calmette, conductor of the Pasteur Institute in Paris, was severely bitten by a venomous snake whilst at work in the laboratory. A colleague who was present injected an anti-toxin serum immediately, and Dr. Calmette escaped with a swelling of the hand and wrist and a high temperature.

NOTES ON SOME CASES OF (? MALARIAL) IRITIS, OCCURRING IN PERSONS THE SUBJECTS OF MALARIAL FEVER AND RELIEVED BY QUININE.

By Arthur T. White, L.R.C.P., M.R.C.S.

Late Medical Officer to the Uganda Protectorate,

Equatorial Africa.

The three cases which form the subject of these notes had all to my knowledge suffered from malarial fever acquired while residing in East Africa, either in the Uganda or East Africa Protectorate, where malaria and its malignant form, commonly known as "blackwater fever," are both very common.

A. S., Soudanese, a sergeant in the Uganda Rifles,

stationed at Machakos in British East Africa, was seen by the writer, who was in medical charge of the station in the absence on leave of the Protectorate medical officer, Dr. Mann, in June, 1898, and was then suffering from severe photophobia, with dilated, fixed, and discoloured pupil, and an intensely injected conjunctiva. There was no history of syphilis, and his wife and family, who were both examined later on, were quite healthy. As is commonly the case with Soudanese, there was a great deal of acquired and congenital syphilis in the man's company. The attack had come on suddenly in the evening, after musketry practice in a hot sun and a severe glare. The patient had only been away from the hospital for two days, where he had been for a week previously treated for malarial fever of a quotidian type, with some splenic enlargement. During this time there had been no examination of the blood, as the writer's microscope was not available, owing to difficulties of transport, the result of the then existing mutiny, and there were at the time no appliances for microscopic examination provided in the Government station hospital. As the patient showed no signs of improvement after three days under atropine and hot fomentations, he was put on twenty-grain doses of salicylate of soda. Owing to the severe pain at night, chloral had to be given. On the evening of the eighth day of the disease, the writer mentioned the case, and remarked on its obstinate resistance to treatment, to Capt. Hinde, the District Officer, who had been at one time a medical officer in the Congo Free State. He suggested that it might possibly be a case of malarial iritis, of which he had seen cases when on the Congo with Baron Dhanis' Expedition in 1895, and recommended that the patient should be at once put under quinine. This was done the next day; fivegrain doses three times daily, with an aperient, giving marked and immediate results as regards the pain. Within a week the severe pain and photophobia had cleared up, leaving behind a few anterior synechiæ. In this case it will be seen that the man was just recovering from a malarial attack for which he had been treated by quinine. When discharged to duty, he was ordered to present himself for quinine every morning at the dispensary and had not done so, so that at the time the attack came on he had been for some days without any quinine.

The second case occurred in a Soudanese private, B. S., also of the Uganda Rifles, who came to the dispensary at Machakos in the end of July, 1898,

with a history of severe pains in both eyes, with lacrymation and photophobia, which had occurred suddenly, first in one eye and then in the other, some eight days previously. He had been seen in my absence by a medical man who was passing through the station, and had been ordered atropine and hot applications. Owing to writer's absence from the station with a punitive expeditionary column, he was not again seen till a week after the onset, when there was, according to the patient's story, no improvement. Both eyes were severely injected, the pain and photophobia were severe, and there was a diffused haziness in the deeper layers of one cornea, with a fixed irregular pupil of a muddy-brown colour. The patient denied any history of syphilis and showed no evidence of it, but admitted having exposed himself to chance of contagion among the Masai prostitutes, who are mostly infected, previous to his being married. Unfortunately I did not see his wife and child as I was leaving the station directly with a military caravan for up-country, and in the bustle consequent on our return from the expedition, and in the hurry of preparations for an immediate departure, the matter was forgotten. However, remembering my previous case, the man was put on large doses of quinine, with the rapid relief of the pain, and when I left the station three days later he was practically well. There was a history of frequent malarial attacks for some years, ever since he had served in the Unyoro column on the Nile valley, a hot-bed of severe malaria. My notes do not mention how long previously he had had an attack, but it was noted that his spleen was slightly enlarged.

It could not be said that the station of Machakos itself was malarious, the climate being mild and temperate, and the country open grassy plain and free from swamps, but it was so situated at some 3,500 feet above the sea, opposite to a long gap in the hills, through which at night, after sundown, for a great part of the year, a cold wind blew very strongly, that chills were frequent and latent malaria became acute. This was specially noticed during the time the writer was there in May-August, 1898. As the station was on the main road to Uganda from the coast, caravans came through constantly with English officers and officials proceeding from rail-head to Uganda, the scene at the time of the Soudanese revolt, and it was then noticed that two out of every three officers passing through suffered from malaria, many of them for the first time since their landing at Mombasa.

In this case there was no evidence of syphilis, beyond the history of possible exposure, nor of rheumatism, and for reasons already mentioned, the blood was never examined by the microscope, but the history of the case and the quinine reaction point strongly to malaria.

In the third case I was called to see an Englishman in Government service at Luba's Fort, a station on the Victoria Nyanza shore, in January, 1899, then on his way to the coast from up country. He wrote to me that he was suffering from "ophthalmia." When seen, both eyes were very painful and there was considerable photophobia, with, on further examination, evident iritis, as shown by his discoloured, dilated,

immobile pupil. He told me that the attack had come on two days previous to his arrival at the station, when he had been travelling in an open canoe from Port Alice, some three days away by water along the N. shore of the Victoria Nyanza. He had been exposed to the great heat of the sun and consequent glare from the water, having failed to put up an awning in the boat, as should be done by every European travelling in this way. Thinking it to be an ordinary ophthalmia, such as is fairly common in hot climates, he had bathed his eyes as well as he could with boric-acid lotion, but without much relief. and when seen he was in a good deal of distress, from the pain in his eyes and also what he called neuralgia, severe pain over the distribution of the supra-orbital division of the fifth nerve, which was accompanied by profuse lacrymation. There was some conjunctival injection, with a slight muco purulent discharge. Since the pain in his eyes began he had been feeling "hot" at night and was "not able to get to sleep. His history was that he had had, while up country along the valley of the Somerset Nile, a good deal of fever, but had not had blackwater fever, and had not taken quinine regularly, but only during the attacks. His last attack, which from the history was of the bilious remittent type, had been some five weeks previously. His spleen was enlarged to rather more than one finger's breadth beyond his ribs, and there had been some discomfort and tenderness over the liver, which had passed off while he was on the march. He described his consumption of alcohol as "moderate," which, I believe, is a suitable adjective in his case. At this time there was only a very scanty supply of medical stores available in the station—in fact, little but blue bills, quinine, and Dover's powder, as the stores for the Protectorate, which should have come up long before, were detained at the coast for want of transport, which for some months previously had been monopolised taking up complete and expensive rations for the Biluchi regiment, then in Uganda. However, with some "tabloids" from my hypodermic case, I managed to make some atropine drops, and with these and compresses of trade calico wrung out of hot water, and covered with the waterproof lining of a sponge bag, I managed to make him more comfortable. For the first three days of his stay in the station he got slightly better, the pain and lacrymation abating, although the dimness of vision and photophobia remained much the same. On the afternoon of the fourth day I was called to him and found him with a temperature of 103.6, in the hot stage of a malarial attack. It appeared that during the night previously he had had an attack of acute diarrhœa and belly-ache, following on a meal of sardines tinned in oil, which had been opened the day before, and as there had been some rain during the night, he had probably got chilled in going to and from the latrine, which was some distance from his tent. With the onset of the fever his iritic symptoms became worse, and the pain intense, together with some increased dimness of vision, accompanied by a cloudy, aqueous, and punctate deposit on the posterior surface of the cornea. As he was suffering a good deal from the fever and the pain, I gave him six five-minim tabloids of Burroughs and Wellcome's tinct.

opii, which I happened to have by me. This sent him to sleep and into a profuse sweat in about half an hour. In the light of the other cases, I decided that quinine might relieve his iritis as well as his fever, and with a view to rapid effect, as soon as the sweating began, I gave him three grains of quinine bihydro-chloride, which is readily soluble in water, by intramuscular injection, and in four hours another three grains. By the morning the fever had gone, and there was very marked alteration in his eyes; the pain had gone, and though there was some, congestion of the circumcorneal zone and some marked discomfort, yet it was much less than before. The next day he had a slight return of the fever, though he was taking five grains of quinine three times a day, but that and the iritis gradually abated, and when he left the station some days subsequently, the irregularity of the still dilated pupil from anterior synechiæ was the only trace of the attack left. He was advised to continue his quinine, five grains daily, till he left the country, and with the exception of some slight attacks of fever on the voyage, he remained well till the end of 1899, since when I have not heard of him.

With regard to his blood, this was not examined till the morning when the feverish attack began. Luckily my travelling microscope (Major Ross's pattern) arrived from another station, and I was able to examine the blood in fresh films. Under a \( \frac{1}{12} \) oilimmersion, there were numerons intracorpuscular parasites, of a large size (filling nearly the whole of the corpuscle), with fine pigment granules in many of them. Amœboid movement was present in a fairly active form. There were no crescents seen, but a few parasites were apparently "ring shaped." Many of the infected corpuscles seemed larger than normal.

The blood was examined once again on the morning of the slight rise of temperature following the acute attack. There were a few pigmented parasites, but so few that careful searching was necessary to find them. There was a small amount of free granules of pigment. The general size and appearance was that of the benign tertian parasite. It was not possible to examine stained specimens owing to lack

of appliances.

In this last case there was no history of syphilis obtained. He had never had any symptoms pointing that way, though he had exposed himself to the risk of contagion. Syphilis and gonorrhœa were both very rife in the stations of these Protectorates, particularly among the Soudanese women, and also in stations where there are Masai prostitutes. Moreover, in Uganda proper, where the women folk are of a somewhat easy virtue, there is a good deal of disease. But in none of the cases was there any direct evidence of syphilis or rheumatism. Rheumatism, except in those who have had it elsewhere, is, as far as I am aware, unknown in Uganda. Gout, another cause of iritis, was not present either. Accordingly, in the absence of other causes and in view of the associated malaria, I am inclined to the view that these cases are malarial in origin. In each case the reaction to quinine was most marked. To those interested in the subject I would recommend a short but excellent article, by Major M. T. Yarr, R.A.M.C., in the JOURNAL OF TROPICAL MEDICINE for December, 1899, which,

together with the matter contained in his paper read before the annual meeting of the British Medical Association in 1898, gives a great deal of information about the known facts of the relation of malaria to eye diseases, more than can be found in any of the published works in English on ophthalmology or tropical disease with which I am acquainted.—The Westminster Hospital Reports, 1901.

#### SELECTIONS FROM COLONIAL MEDICAL REPORTS FOR 1898 AND 1899.

This most important volume consists of selections appertaining to the diseases, geology, botany, afforestation, agriculture, vital statistics, &c., of some thirty British colonies. Although largely taken up with tables and figures, the student of tropical medicine will find interesting and useful reading and information in the selections. This is the first attempt in the direction of producing a compendium of hygiene in its widest sense for the Colonies, and the Colonial Office is to be congratulated on the work. The volume extends to 420 pages, and may be obtained from Eyre and Spottiswoode, Fleet Street, London, E.C.; Oliver and Boyd, Edinburgh; and Ponsonby, Grafton Street, Dublin, at the modest price of 1s.  $10\frac{1}{2}$ d.

#### Mosquito Collection in Hong Kong.

The following report by Dr. J. C. Thomson, M.D., M.A., in a report to the Government, gives the results of his examinations of mosquitoes in Hong Kong during the second quarter of 1901:—

"During the months of April, May and June, 1901, 12,539 insects were examined, when 342, i.e., 2.7 per cent., were found to be Anopheles, of three species; and 12,197, i.e., 97.3 per cent., Culex, of

ten species.

"I reserve all consideration of the nomenclature and description of the different species for a general report on the subject of the mosquitoes of Hong Kong, which I propose to submit after my next quarterly statistical report, when my inquiry will have extended over a period of twelve months."

The increase in the number of mosquitoes during the summer months is well illustrated in the following

table:--

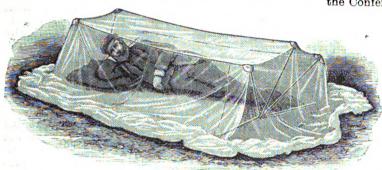
	Mosquitoes Examined	Anor	HELES	Cu	LEX
		Number	Per cent.	Number	Per cent
Last quarter of 1900	3,539	294	8.3	3,245	91.7
First quarter of 1901 Second quarter of 190.	7,490 12,539	227 342	3.7	7,263 $12,197$	97·3

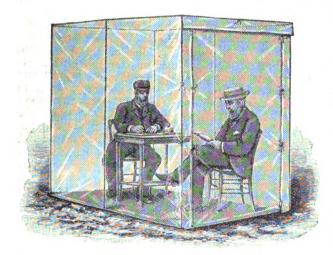
FOR HEPATIC COLIC.—To Chauffard (Revue Médicale de Normandie, May 10th) is ascribed the following formula:—

R Olive oil ... from 4½ to 12 ounces.
Cognac... 2 ounce.
Yolks of 2 eggs.
Menthol ... 7½ grains.
M. To be taken in two doses at half an hour's interval.

## PROTECTION FROM MOSQUITOES.

Messrs. White and Wright, Surgical Instrument Makers, Liverpool, have, at Major Ronald Ross's suggestion, devised a Mosquito Hood and House. The materials used consist of bamboo and ordinary netting, and their lightness and convenience in packing render them easily carried by the traveller. The Hood is to be used when the recumbent position is assumed, and the House is intended for protection during resting, writing, &c. After all our investigations, recommendations, and prophylatic suggestions for protection against mosquitoes, the mosquito net





is the one form that has stood the test of time, and in all probability will continue in use when protection by drugs, by draining of swamps, by destruction of larvæ by petroleum, or other measures, are still being experimented with. Clearing a continent of malaria is a gigantic problem, but the protection of the individual by such simple devices as the Hood and House brought to our notice by Messrs. White and Wright is within the reach of every traveller's means. We recommend every one proceeding to tropical countries, whether to take up residence there or merely as a visitor, not to leave these shores without a House and Hood in their travelling trunk.

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## Bebiews.

DIE LEPRA (leprosy). By Dr. Victor Babes (Wien, 1901).

Dr. Babes' work is well-timed, as at the present moment leprosy in all its bearings is being much discussed. The book discloses a thorough knowledge of the subject and is based upon personal experience. Dr. Babes, in the preface, expresses himself as follows: "In undertaking a somewhat exhaustive treatise on leprosy, I believe that I am on the one hand supplying a want in presenting the important works read at the Conference on Leprosy, and on the other hand in

publishing the results of my personal experience on questions that at present are still open ones."

Chapter I. is devoted to an exhaustive history of leprosy from the time of Herodotus to the present day. Chapter II. deals with the geographical distribution and the statistics of the disease. The remainder of the book is devoted to the etiology, pathology, symptoms, diagnosis, and treatment of the disease.

Professor Babes is of opinion that unfavourable sanitary conditions cause

the introduction and propagation of the disease, which is more frequent amongst the poor and ill-nourished than in those of a better class.

In only 12 per cent. of his cases was Babes able to prove heredity, but he considers the contagious nature of leprosy to be unquestionable. He has no doubt that leprosy is a "family" disease; in many cases the parents, however, are attacked after the children.

The chapter relating to the pathological anatomy of leprosy is one of the most interesting and important in the book.

Hitherto the author's attempts at sero-therapy have failed; he is nevertheless not baffled, and still lives in hopes of discovering a sufficiently strong toxin to react on the bacilli, by destroying, absorbing, or eliminating them from the system, whilst the same must have no injurious effect on the human body—a difficult and dangerous combination which the author does not lose sight of.

The book is well illustrated, well printed, and well edited. We cordially recommend it to the notice of all our readers.

A Malaria Conference in New York.—At a meeting of the New York Board of Health, on July 31st, a discussion on Malaria and its Prophylaxis was held. The Board decided to circulate directions, in connection with this subject, drawn up by Dr. H. M. Biggs, to the medical practitioners of New York. The precautions recommended were those adopted in most attempts of the kind, namely, screening houses and beds; the isolation of malarial patients; the administration of quinine during and for a considerable time after attacks of fever; removal of breeding places of the anopheles mosquitoes by drainage, &c., and where drainage was found impossible, throwing petroleum upon the surface of all pools and stagnant water.

## Current Miterature.

THE TREATMENT OF SNAKE BITE.—C. B. Lall, of the Rajputana Medical Service (Indian Lancet, May 20th), reports the case of a native who was bitten by an Echis carinata snake, three feet long. He was seen an hour after the bite and was suffering from constriction of the throat, thirst, deafness, noises in the ears, vertigo, partial blindness and muscæ, heaviness and loss of sensation in the legs, with a feeling of heat all over the body. Temperature, 98.2° F. The leg was cold, swollen, and purplish. A binder was at once applied above the bite and the wound incised, squeezed, and filled with potassium permanganate, and the following draught given :-

R Liquor strychninæ ... Spirit of chloroform ... Water ... ... ... 15 ... 1 ounce.

The patient was forcibly kept awake all night. The binder was loosened after an hour. A speedy recovery ensued.

To Allay Thirst in Fevers.—The Clinica Moderna recommends the following mixture as beneficial in allaying thirst and fever :-

R Pure glycerin ... 7½ drachms.
½ drachm.
ake... 25 drachms. ... Distilled water, enough to make...

M. Sig. From one to two tablespoonfuls at one dose to allay thirst and fever.

THE following formula to disguise the taste of castor oil has been used by Dr. Barkman, of Texas, for forty-five years :-

... 1 ounce. R Castor oil...

White sugar ... ... 1 ounce.

Essence peppermint ... ... 35 drops.

M. Sig. Rub well together. Then add two tablespoonfuls of boiling water and stir until cool enough to drink.—Medical Brief, September, 1901.

TABLETS OF HYDROCHLORATE OF QUININE.—In the Archives de Médecine et de Pharmacie Militaires, M. Masson alludes to a discovery of M. Ricard's regarding the compressing of hydrochlorate of quinine into tablets. This salt contains four equivalents of water, which it loses when it is heated to 100°. When brought to a temperature of 50°, it loses only one equivalent of water, which it takes up again with avidity. To make the tablets, the salt is mixed with a sufficient quantity of water to form a firm mass, which is granulated and heated to 50°. The added water, plus the one equivalent of water of crystallisation, is then lost. It can then be formed into tablets, which disintegrate completely on contact with water. If placed under a moist bell-glass instead of being immersed in water, they take up again the one equivalent of water, and do not then disintegrate readily. To make the granular mass into tablets 5 per cent. of tale is added, and the mixture compressed while kept warm.—British and Colonial Druggist, August 16th, 1901.

THE Pasteur Institute for India, which was opened at Kasauli about a year ago, has done excellent work. Three hundred and twenty-one patients have been treated. The institute is in charge of Major Temple; it is largely used for army patients.

A BUST of Dr. Armaner Hansen, the discoverer of the leprosy bacillus, has been unveiled in the garden of the Museum at Bergen. Dr. Hansen has recently celebrated his 60th birthday. His discovery was

published in 1873.

THE ANOPHELES AS HOST OF A TREMATODE.—The Rome correspondent of The Lancet states that Marbirano, while examining the stomach and salivary glands of hybernating mosquitoes, found that a large number of these insects acted as hosts of a small trematode worm of the distomida family. These were encysted, and also found free in the thorax and "Each cyst contained only one distoma of a flat, leaf-like, form, oval, somewhat elongated, becoming during its active progressive movements after its liberation from the cyst narrow and ribbonlike in shape." Several of the anopheles were also infected with filaria, which were found in the Mal-

pighian tubes.

MATERNITY NURSING IN JAPAN.—A nurse in Tokio, who is occupied chiefly in nursing maternity cases, found it for some time a source of difficulty to dispose of the placenta or to get it disposed of. Not knowing the language, it was awkward for her to make the Japanese servants understand; and there are not many facilities for having it burnt on the little charcoal stoves, &c., which are used in that country. But quite lately she discovered that there is in Tokio a factory, the business of which is to dispose of placentas. On receipt of a card or notification the company will send for it, and either burn or bury it, as desired, for a fixed price; in fact, there are three classes-first. second, and third-each having a different price. The first-class placentas are buried; the second and third class are burnt. There is another thing in connection with this branch of nursing as practised in Japan which is unusual, namely, not tying the cord on either the infant's or the mother's side, but simply cutting it after the pulsation has ceased. A custom very prevalent amongst the Japanese women is the wearing of a tight binder for many months before the confinement. This custom is very much condemned in the local papers as one of the chief reasons for the small stature of the people.-" Hospital" Nursing Mirror, August 3rd, 1901.

How the Arabs Avoid Prickly Heat .-- "Arab" writes to the Aden Weekly Gazette as follows :- With reference to an article which has appeared in the Indian Medical Record, by Dr. R. R. H. Moore, regarding the use of cocoanut oil for avoiding prickly heat, I beg to state that from time immemorial the Arabs use for this purpose sesame (gingelly) oil. The oil is diluted with water and applied to the parts where the prickly heat is, generally at the time of going to bed. It allays the irritation and dries and removes the pimples in two or three applications. This oil is held in high esteem amongst the Arabs who live in the interior, and who are in the habit of anointing their skins with it when they feel at night fatigued and tired from their day's work, as it gives vigour and firmness to the limbs and body, and enables the workman to get up fresh and vigorous next morning. Besides, during the winter it has some effect in protecting the body from the piercing cold, as the Bedouins go about often naked without

any coat. The oil is used for such a purpose pure without water, and it is rubbed briskly into the skin. Not only in Yemen, but also in Hadramant it is used, and the people universally believe that it conduces to good health. When there is high fever and the body is aching, the skin of the patient, whether he is an adult or a baby, is anointed with gingelly oil, and the patient gets relief, the skin becoming soft, and the temperature reduced. The remedy is resorted to even by patients under the treatment of European doctors here.

The Arabs do not use soap, as it disfigures the body and inflames it in a tropical climate, but they use various other remedies made from the leaves of certain trees which are obtainable very cheaply in abundance, and which are as efficacious as soap for removing grease, oil, and dirt, and which refresh and cool the skin and render it clean and healthy. Some of these form a lather like soap, but exercise no such injurious effect as soap.

A REPUTED YELLOW-FEVER SERUM.—It is reported that Dr. Felipe Caldas, a Brazilian bacteriologist who claims the discovery of a yellow-fever serum, has gone to Cuba to conduct experiments. He will first visit Santiago, where the fever is now prevalent.—Boston Medical and Surgical Journal, August 1st, 1901.

#### Letters, Communications, &c., have been received from :-

B.—Dr. W. Leonard Braddon (Malay Peninsula); Dr. Blayney (Manchester); Dr. A. Boddaert (Ghent).

C.—Dr. Cousland (Swatow); Dr. A. Caccini (Rome).

D.—Dr. A. Dalgetty (Madabpore); Surg. Lt.-Col. S. H.

Dantra (Burmah). G.—Dr. Grassi (Rome).

H.—Dr. A. H. Hanley (Dublin); Staff Surg. P. Handyside, R.N. (Esquimalt); Dr. Hewlett (Trinidad).

M.—Dr. J. T. Moore (Texas); Dr. W. A. Mackay (Spain);
Dr. Murray (Fiji); Dr. Milton (Cairo).

B.—Dr. Lohn Books (Cald Coart).

R.—Dr. John Roche (Gold Coast). S.—Dr. Sandwith (Cairo).

T.—Surg. J. Marles Thomas, R.N. (Zambesi River).

## EXCHANGES.

Annali di Medicina Navale.

Archiv für Schiffs u. Tropen Hygiene.

Archives de Medicine Navale.

Archives Russes de Pathologie, de Médec., Clinique et de

Bacteriologie.

Australasian Medical Gazette.

Boletin de Medicina Naval.

Boston Medical and Surgical Journal.

Bristol Medico-Chirurgical Journal. British and Colonial Druggist.

British Journal of Dermatology.

British Medical Journal.

Brooklyn Medical Journal.

Climate.

Clinical Journal.

Clinical Review.

Giornale Medico del R. Exercito.

Hongkong Telegraph.

Il Policlinico.

Indian Engineering.

Indian Medical Gazette.

Indian Medical Record.

Journal of Balneology and Climatology.

Journal of Laryngology and Otology.

Journal of the American Medical Association.

La Grèce Médicale.

Lancet.

Liverpool Medico-Chirurgical Journal.

Medical Brief.

Medical Missionary Journal.

Medical Record.

Merck's Archives.

New York Medical Journal.

New York Post-Graduate.

Pacific Medical Journal.

Polyclinic.

Public Health.

Revista de Medicina Tropical.

Revista Medica de S. Paulo.

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- 2.—Manuscripts sent in cannot be returned.
  3.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
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- 6.—Correspondents should look for replies under the heading "Answers to Correspondents."

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## Original Communications.

## ON ANKYLOSTOMIASIS IN SOUTH CHINA.

By J. Preston Maxwell, M.B., B.S., F.R.C.S. Changpoo, Fokien, South China.

THE importance of a thorough knowledge of the intestinal parasites, by the man who practises in the East, cannot be over estimated.

A routine examination of the stools of one's patients would in many cases prove a veritable revelation. On the other hand the writer considers the subject is by no means unattended with difficulty. In the course of a short experience he has found that whereas the diagnosis of the common ova, such as those of ascaris lumbricoides and ankylostomum duodenale, are usually clear, yet atypical forms are not infrequently met with and may prove as yet difficult of diagnosis. Fortunately in the case of ankylostomum duodenale, the ova are so distinct that there is no difficulty in determining quickly and certainly whether they are present or not.

In visiting a colleague's hospital lately, the writer was able to prove to his friend's complete satisfaction that three old patients, who had been treated for weeks for malarial cachexia, were really pure and uncomplicated cases of ankylostomiasis. And it is his opinion that a great many of the obscure so-called "malarial cachexias" of this sub-tropical region will turn out on fuller examination to be cases of ankylostomiasis.

In this region there are three classes of patients infected with this parasite:—

(a) Those in whom it is the sole disease, and whose anæmia is due to the pernicious action of the parasite, viz., uncomplicated cases.

(b) Those in whom it is one of several factors in bringing about a state of debility and anæmia, viz., complicated cases.

(c) Those in whom, as far as one can judge, the presence of the parasite causes but little trouble, and would not be suspected were it not found on casual examination of the stools, viz., incidental cases.

Notices to Correspondents ...

Those the writer would place in the first class are cases of severe anæmia, in whose stools are many ankylostomum ova, who have not suffered from recent malaria or acute specific fever, who are not opium smokers, whose spleen cannot be palpated, and in whom there is not a profound round worm infection. Of course the subjects of tubercular phthisis, Bright's disease and the like, are excluded.

In the second class he would place those who are suffering from a serious ankylostomiasis infection, but in whom there is, in addition, an enlarged malarial spleen, active malarial infection, or one of the other diseases mentioned immediately above.

In the third class fall the large majority of those in whose stools the ova are found. This class are not suffering from anæmia, the infection is very slight, as shown by the number of ova, and there are practically no symptoms. This must not be taken as evidence that it is innocuous in these cases, as there is no proof on the point.

Ætiology.—As far as the writer has been able to observe, the cases occur mostly among agriculturalists, and among strong, healthy men of middle age or rather younger. Considering the Chinese habit of using fæces and urine, both in the fresh condition, for watering vegetables, and after storage for manuring fields; and considering that it is not an uncommon thing to see a field worker take the filthy water from the edge of these same fields, and either drink it or wash his mouth out with it, there is one good road open whereby infection may occur. So far I have only been able to trace the exit of the embryo from the ovum, which occurs rapidly after the fæces have been voided. The description of the parasite (male and female) and the ovum given in the usual textbooks are perfectly sufficient for identification, and with care the parasites are easily found. It is best to

mix the fæces with water and then pass them through a fine wire sieve.

Diagnosis.—The patient, affected with pure ankylostomum infection, does not, as far as the writer is aware, present any absolute diagnostic appearance, but this much may be said, he is not wasted, but looks rather like a strong healthy young man who has had the colour taken out of his face and replaced by a sallow earthy tinge. From pernicious anæmia, which resembles it mostly in outward appearance, it may be distinguished by an examination of the blood, combined with the presence of ova in the stools. The main distinction is that poikilocytosis, if it occurs at all in ankylostomiasis, is not a marked feature; it has not occurred in any of the cases on which this paper is based, although, as may be seen by the blood counts given below, the condition of anæmia may be extreme :-

Case 1.—Aged 26. Red corpuscles, 2,050,000.

H., 20 per cent.

Case 2.—Aged 32. Red corpuscles, 1,500,000. H., 15 per cent.

Thoma-Zeiss hæmocytometer and Von Fleischl's hæmometer used.

There is no marked leucocytosis, and in all the cases seen of this class no enlargement of spleen or lymphatic glands. There is no sign of disease in other parts of the body. As a rule the urine is free from albumen, and this may be the case even when a condition of extreme anæmia with breathlessness and ædema of the legs has been reached. In other cases there may be a faint trace, but only when the

anæmia is extreme.

The stools in the cases on which this paper is based were not specially foul, and contained numbers of the typical ova. Blood has not been a marked feature in them, a trace occurring now and then. Their colour is often brown tending to leaden grey. Diarrhœa slight in amount is very common in these cases, and dyspeptic symptoms are common. Headache is sometimes met with; as to the appetite, sometimes it is ravenous, but very often the opposite. This may be accounted for by the fact that the majority of these cases do not come to hospital till they are very bad, and in some, they have been progressively getting worse for the last four or five years.

Many of the cases have no rise of temperature at all, and in some cases the morning reading may run for days as low as 96.5° or 97°. Other cases have a

slightly raised irregular temperature.

In the complicated cases the diagnosis rests on the discovery of numbers of ova in the stools, and very often this is discovered during the revision of a case of, say, malarial anemia, which without any obvious adequate cause is not improving under treatment.

The diagnosis in the incidental cases rests on the accidental discovery in the stools of a few ova.

Treatment and Prognosis.—In fairly early cases under appropriate treatment the prognosis is very good, but when one gets a case reduced to the last extremity it is very difficult to say what will be the ultimate result. Granted that you have conquered the parasite, your patient has a long period of convalescence before him, during which, in his weakened condition, he is liable to fall a victim to a severe attack

of æstivo-autumnal fever or the like. The chances of the patient very largely depend on the degree of anæmia, the presence or absence of complications, and his willingness to place himself for a long time under treatment. Too often, having improved a little, the native thinks he can leave hospital and do a little work, thereby greatly lessening his chances.

As to drug treatment, the writer always begins with santonin to clear out the round worm, followed by

a sharp purgative.

As the cases he has to deal with are mostly much reduced, thymol (gr. x.) is given every second night for three or four times, on each occasion being followed by castor oil in the morning. But although this brings away the ankylostomes, it does so slowly, and in his opinion a specific easier of administration and causing less depression would be a great boon. At present he has under his care a patient who has been under treatment in hospital for a month, has been repeatedly dosed with thymol (gr. x.-gr. xx.), and whose fæces still contain numbers of ova.

Much attention must be paid to the diet. should be rich and at the same time easily digested, and in tropical countries the combination of quinine with the iron, which is of course to be prescribed, is

a great advantage.

#### THE GEOGRAPHICAL DISTRIBUTION OF BILHARZIA.

By W. G. TOTTENHAM POSNETT, F.R.C.S.I. No. 8 General Hospital, Bloemfontein.

THE occurrence of two cases of bilharzic hæmaturia having been admitted to my wards in this hospital during the last few months has led me to believe that the geographical distribution of this parasite is of a

much greater extent than is generally supposed.

Manson in his book on "Tropical Diseases" says it is found in Natal, Mauritius, the Gold Coast, in Tunis, "and it probably exists in many other parts of Africa." This surmise is borne out by the paper by Dr. Daniels in the JOURNAL OF TROPICAL MEDICINE of June 15, 1901, in which he says "Bilharzia as a cause of hematuria is common in all districts "(British Central Africa). The following notes will, I think, add still further strength to Dr. Manson's conjecture.

Case 1.—Pte. W., 2nd Worcesters, aged 24 years, was admitted to No. 8 General Hospital, June 16th, 1901, complaining of passing blood in his urine. He first noticed it a month before admission. He has been in South Africa nine months. His movements have been as follows: three weeks in Durban, Natal; then trekked through the Tugela district into the Transvaal; was trekking about the Koomati Poort and Lydenburg districts for four months; then marched to Pretoria, where he remained six weeks; then went to Kroonstadt in the Orange River Colony, where he remained until he was sent down to Bloemfontein.

He states that the last two or three drops of urine voided consists of bright coloured blood. He has to get up once or twice at night, micturition normal in frequency during the day. There is a burning sensation at the meatus and root of the penis after urination. There is a dull pain over pubes when the bladder gets full. He has slight chronic cystitis. Microscopically, ova of bilharzia hæmatobia are

present in the urine in small numbers.

Case 2.—Pte. C., 1st Oxfords, aged 22½ years. Landed at Cape Town in January, 1900, and took part in the general advance under Lord Roberts, which ended in the capture of Pretoria. He then marched to the Crocodile (Limpopo) River and remained in the Magarisburg district for only five days. He was then sent to the Orange River Colony, about which he trekked for four months; then to the Klerksdorp district of the Transvaal, where he remained until he contracted enteric after two months in that locality. He was sent to hospital in Pretoria January 24th, 1901, and discharged to duty April 30th. He noticed blood in his urine for the first time in the latter part of May, but did not take much notice of it for a month, when he went sick and attended the hospital. He was sent to No. 8 general hospital August 13th. He complains of passing blood in his urine, the last few drops being almost pure blood. He has a dull pain in his back, also at meatus and base of penis, which is worse after urination. Some nights he has not to get up, but if he has drunk much liquid in the evening, the same night he has to be up two or three times. He has noticed that there is considerably more blood if he has had a hard day's ride, especially if he could not get sufficient to drink. The microscope shows that the urine contains bilharzia ova.

The above cases, I think, prove that this disease has a wider distribution than is generally considered. It was only a few weeks before case 1 was admitted that a microscope was supplied to the hospital, and I remember several cases that were diagnosed "hæmaturia," which, I do not doubt, would have proved to be the disease under consideration had a microscope been available. I do not consider that I am far wrong when I state that 80 per cent. of the cases of so-called "hæmaturia" that have occurred among the troops during this campaign have been due to

bilharzia.

It is not surprising that a large number of cases should occur when we consider that the thirsty troops after a hard march, in the great majority of cases, have nothing to drink but the water contained in the dams of farms, or a "water hole."

It is very probable that we will find that this parasite is distributed throughout the African conti-

nent.

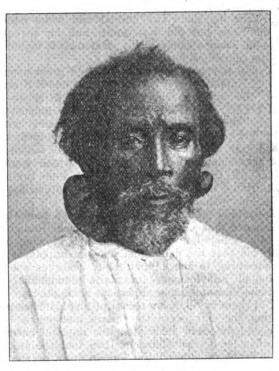
## NOTES ON CASE OF FIBROMATA.

By J. H. Hugh Harrison.

Assistant Colonel-Surgeon, Belize, B.H.

N. M., aged 55, a black Spaniard from Truxillio, S. Honduras, was admitted into hospital suffering from multiple fibromata, three of which are visible in the photograph. Two were connected with the lobules of the ears. The patient stated that eight years ago he noticed a swelling at the back of the lobule of this right ear, which gradually became larger and spread to his neck; later a similar swelling appeared in his left ear, but this was confined entirely to the lobule.

When admitted the tumour was found extending from the back of the lobule of the ear to the neck by a thin skin pedicle for about three inches. The left tumour, about one-third of the size of the right one, was confined entirely to the back of the lobule, which it dragged, owing to its weight, considerably downwards.



FIBROMATA OF THE EAR LOBULES.

I operated without an anæsthetic and removed both at one sitting; healing was by first intention. Right tumour weighed  $18\frac{1}{2}$  ozs.; left  $6\frac{1}{8}$  ozs. Examined microscopically I found them to be entirely fibrous.

NOTE ON THE ENTRANCE OF ANKYLOSTOMA EMBRYOS INTO THE HUMAN BODY BY MEANS OF THE SKIN.

Read at the British Medical Association Meeting, 1901.

By F. M. SANDWITH, M.D., F.R.C.P.

Professor of Medicine and Senior Physician to Kasr-el-Aini Hospital, Cairo.

It has long been assumed that the chief mode of ankylostomiasis infection in the various countries from which the disease has been reported is by the mouth while eating or drinking. Dirty hands, muddy feet, and unwashed vegetables are daily factors in the peasant's life, and are probably responsible for much of the infection.

It is more difficult to see how drinking even muddy water can communicate the disease, for we find experimentally that running water kills the larvæ, while in stagnant pools or wells they soon sink to the bottom, and therefore can only be drunk if the



water be stirred up. Dr. Looss finds in Cairo that in summer the larvæ are fairly active, but in the cool weather they sink to the bottom in half an hour. As an instance, however, of acute ankylostomiasis infection by the stomach I may recall an experiment carried out at the Cairo Medical School. The larvæ of an analogous worm, Trigonocephalum ankylostomum, were administered in milk to a healthy dog, aged four months. The animal had some retching at the time, but did not vomit, and for seventeen days he seemed fairly well. But on the eighteenth day he refused all food and died.

A post-mortem examination showed great anæmia, and the intestines were white, except about 8 inches from the pylorus, where they began to be swollen and bluish-red. Here bathed in bloody mucus were no less than 7,179 young immature worms, with a very few scattered above and below this spot. The blood was due to capillary hæmorrhage, which was not traceable to the very few bites which could be seen. All the ankylostoma embryos were the same size, from 6 to 7 millimetres long, of normal appear-

ance, and without sexual organs.

In spite of evidence such as this, which seems quite conclusive that infection can take place through the mouth, it has for some years been a growing belief with me that the skin must play an important part in admitting to the human body embryos such as those of ankylostoma (uncinaria duodenalis) and distoma hæmatobium and perhaps some others.

But there has been no record of any parasite penetrating the skin, even the filaria medinensis being refused by modern authorities this mode of entrance, so when Dr. Looss¹ stated in 1898 that the ankylostoma embryos entered the human body by the skin as well as by the alimentary canal, his statement met with only hostile criticism. He decided to write nothing more on the subject until he was able to definitely prove the fact, and the chief object of this communication is to call the attention of the members of the Tropical Section to his interesting

discovery.2

Like many another this discovery was made by On one occasion, while working in his laboratory, a drop of water containing more than 1,000 lively larvæ of the ankylostoma duodenale happened to fall on the cleft between two fingers of Dr. Looss's left hand. He was surprised to find that this was followed by redness and burning at the spot, and he wondered if this could be caused by the larvæ. He therefore allowed another drop to fall upon another part of his hand, and this was again followed by a burning sensation and redness, while examination of the drop of fluid on his hand some minutes later showed countless empty embryo sheaths and a few sluggish embryos.

Most of the larvæ had evidently entered the skin, leaving their sheaths behind. Dr. Looss thereupon found himself reinfected with the worms; eggs reappeared in his fæces, debility and anæmia followed,

requiring a prolonged cure of thymol. Both he and I then became convinced that this method of infection probably accounted for previous attacks of the disease for which I had had to treat him. For the last seven months he has continued to handle similar cultures of active embryos, but no reinfection has occurred since he has taken the precaution of washing his hands with 90 per cent. alcohol.

The experiment upon Dr. Looss is not convincing, because he had, as I have said, previously suffered from the presence of ankylostoma in his intestines.

He next experimented upon a piece of skin removed from a fresh human corpse, and warmed to 99° F.; but this did not show any entry of embryos, possibly because the skin at once became too shrivelled

The next attempt was more successful. It was made upon the leg of a boy, aged 13 years, one hour before the limb was amputated. The leg was thoroughly washed with soap, nail brush, and water, then dried; and then one drop of water containing many larvæ was dropped on the skin and left to itself without being rubbed in. The drop spread out and dried up in ten minutes, and produced no redness of skin. The patient was not asked whether he felt a burning sensation.

One hour after the drop came in contact with the leg the limb was amputated, and the suspected skin was at once removed from it and spread out with pins, gradually hardened in alcohol, and then embedded for section cutting. The sections when examined showed that the larvæ had entered the skin principally by the hair follicles. So far as the drop had spread there was hardly a hair follicle free from

young ankylostoma.

In some there were single embryos, in others there were masses. In several cases the larvæ were seen in different stages of entry, the tail still outside, whilst the head had pushed itself between the hair and the neighbouring epidermal layer of the hair follicle. Some of the sections were unfortunately broken in preparing the photomicrographs, of which I now show you copies, but I have here one of Dr. Looss's sections under a microscope.

The progress of the larvæ seems to be as follows:— When once inside the hair follicle they push their way towards the hair papilla, during which process, if there are many of them, the root sheaths of the hair are almost completely destroyed. When they get to the hair papilla they leave it to pierce the surrounding

tissue of the true skin.

Until they enter the hair follicle they have no purchase for their tails, but having once entered, they progress by their own boring action and the side resistance offered to their propelling tails. It must be remembered that the hair follicle is a recess of the corium sunk below the general surface of the skin, and that the hair papilla is a cutaneous papilla rising up in the bottom of the follicle. The embryo, therefore, takes a very practical way of forcing him-self into the subcutaneous tissue. He never seems to penetrate into the ducts of the sebaceous glands nor into the sweat glands. Although the hair follicle seems to be the chief gate of entry, there are very likely other methods by which larvæ under other

photographs.

Centralblatt für Bakteriologie, Parasitenkunde und Infecktionskrankheiten, Bd. xxiv, p. 483.

<sup>2</sup> Ibid., May 31st, 1901, for paper, and July 5th, 1901, for

circumstances penetrate the skin. For instance, in Lower Egypt, during the spring and autumn the dorsal aspects of the hands and feet of many of the peasants are blistered by pellagrous erythema, which may help the embryos to enter. This may possibly account for the fact that so many of our hospital patients suffer from the two diseases, pellagra

and ankylostomiasis.

The Egyptian peasant works all day with his naked feet, legs, and hands exposed to a coating of mud, mixed with water containing ankylostoma embryos which have sprung from the eggs contained in the fæces of infected natives. Latrines are unknown in the country villages and every man eases himself whenever and wherever he thinks fit. The entrance of embryos of the ankylostoma into the human skin affects many countries besides Egypt, and may account for some of the infection reported from India, the Italian rice fields, St. Gothard tunnellers, and mine labourers in Southern Europe where men work with bare feet in infected mud and water.

I hope that we shall be able for some years to retain Dr. Looss in Cairo, and that he may be able by this discovery to throw some light on the vexed question of how boys and girls in some countries become the victims of bilharziosis, and other parasitic

diseases.

With regard to ankylostomiasis there is, of course, as yet no proof that the embryos can work their way from the subcutaneous tissue to the duodenum or jejunum. That can only be proved by future experiments upon individuals who are certainly free from ankylostomiasis infection, and preferably upon those who have never had any chance of becoming infected.



## INFLUENCE OF COLOUR ON MOSQUITOES.

By OSBORNE BROWNE, M.B.

In consideration of Dr. Nuttall's valuable paper on "The Influence of Colour upon Anopheles," British Medical Journal, September 14th, 1901, pp. 668-669, I venture to give a small experience while I was in the Gold Coast.

I was accustomed to lie down at midday, not to sleep, but to rest; and often I was greatly annoyed by two or three most persistent culices (usually taniatus)? The moment I rose they left me, but as soon as I again reclined they renewed their attacks. I sought about for them to see where they retired, and was surprised to find that it was the black bars of the bedstead that was their retreat.

In view of this fact, I think it would be well not only to paint the inside of one's house of a suitable colour, but to have light-coloured furniture, cushions, &c., and to have the bed painted white or yellow. For this purpose I intend taking out with me some

enamel paint and a brush.

The administration of quinine daily is attended with serious drawbacks in the shape of dyspepsia, nervous irritability, &c.; and we must not forget that it is an unnatural constitutent of our bodies, and is therefore poisonous. Therefore it behoves us

to use all the means in our power to destroy mosquitoes, and prevent them breeding and invading our houses.

It is attention to details that will ensure success in this, as in any other sort of warfare, such as gauzing the windows and doors, or closing house before sundown; opening house to let sunlight and fresh air flush it out during the day; daily brushing of ceilings, walls, behind presses, under tables, &c.; putting all dark clothes away; kerosining the tank; sanding the yard; removing cans, bottles, cocoa-nut husks, &c.; keeping natives at a distance; painting or whitewashing the house white; free use of a good net hung within the poles, thrown up during the day, and PERSONALLY tucked under the mattress before retiring; use of closely woven, hard, and light-coloured clothes; and wearing white blancoed boots and suitable socks; being particularly careful when visiting or travelling; and avoiding late dinners with friends.

Personally, I do not believe in the upturning of earth,

Personally, I do not believe in the upturning of earth, freeing resting spores. I have stood daily for a long time on the top of upturned earth beside what has been termed one of the most pestilential lagoons on the West Coast, superintending the building of a dyke, and I never enjoyed better health. Other factors have to be considered when men say they have caught

fever from upturned earth.

I have kept my child from the time he was born in one of the death traps of West Africa until we went on furlough, when he was 10 months old, without his having been bitten by a single fly or having the slightest fever. In fact, the little chap developed well and weighed about 22 lbs. when we left. He will return with me, and I propose to keep him as free from fever as before. He has never had a grain of quinine. This compares well with the great majority of native children who come to be treated with enormous spleens and wizened faces, in which the dark skin cannot hide the marked pallor.

A CASE OF HEPATIC ABSCESS, PROBABLY SUPRAHEPATIC, TREATED BY TAPPING WITH TROCAR AND CANNULA—RECOVERY.

By G. M. O. West Indies.

LUIZ DE FRIETAS, aged 30, thin and sallow, consulted me at an Estate Hospital in November, 1898, for fever and pain in the abdomen, more especially the hepatic region, which he ascribed to the results of a fall which he had some time previously.

I examined him and found both liver and spleen enlarged; the liver had a hardish feeling. As he owned to having taken much alcohol in his earlier life (he had given up doing so for some years) I thought cirrhosis was commencing. However, I treated him for malarial fever with colic, and he was relieved. A few weeks later I was called to see him at his home, and found the liver more enlarged and very much harder. He had never suffered from dysentery. The spleen was still enlarged. I gave him calomel and jalapine, followed by castor oil and then quinine, which re-



lieved him. I did not see him again till February, 1899, when I was again called to his house; I found him suffering much. The whole of the hepatic region was of a stony hardness, the bases of both lungs were dull, and no air was entering. In front there was tendency to pointing, and at this spot I aspirated, using a long four-inch needle, which was inserted with difficulty owing to the extreme hardness of the tissue; and it was only when pressed in that a small amount of grey pus was obtained. I came to the conclusion that the pus had not the character of hepatic abscess pus, and that it might be a suprahepatic abscess.

The question then arose, whether or not, to tap from the back. I believe it would have been wiser to tap from there, but having obtained pus from the front, I decided to tap therefrom with a long hydrocele trocar. The difficulty was great, it was like boring through a piece of board, and when at last it went suddenly into some cavity, fully five inches distant from the anterior puncture, I almost feared to remove it, but on doing so, the same thick grey matter oozed out of the cannula, which was left in until the following day; carbolic lotion, 1 to 40, being freely injected, a small drainage tube replacing the cannula. This was continued for a week, when I decided on a second operation with a large ascitic trocar. This proved thoroughly successful; half a gallon of feetid pus was evacuated at once. I had not then read Manson's account of operation for hepatic abscess, and had no suitable instruments, hence I had no little difficulty in introducing a  $\frac{1}{4}$  inch drainage tube through the cannula, but at last succeeded by stretching it on an umbrella wire, having tied it over the top, and cut holes at the side. This was readily passed through the cannula when stretched, the cannula withdrawn over it; then on relieving the tension the wire was readily withdrawn, and the pus followed freely while it pressed firmly against the walls of the opening, and there was no hæmorrhage. The patient did well until being impatient of the slow healing and antiseptic injections, withdrew the piece of shortened tube, with the result that a reaccumulation of matter occurred, with great pain, accompanied by a cough. I decided on operating again, but before I could do so he began to cough up the same matter, showing that it had broken into the bronchi.

I performed the same operation again and continued antiseptic injections; put him on carbonate of guaiacol, creasote, and carbolic inhalations. In a few days the purulent expectorations ceased, and he again steadily improved, and is now, August, 1901, thoroughly well, and has been for the last two years. The lung trouble has quite disappeared, and the liver is normal to percussion and palpation. I have no doubt that we had a case of suprahepatic abscess of traumatic origin to deal with, and in no sense connected with the liver, and the right treatment should, perhaps, have been to evacuate it from the back.

THE opening address of the Third Winter Session of the London School of Tropical Medicine will be delivered on Wednesday, October 16th, at 4 p.m., by Lord Brassey.

# "THE VIABILITY OF THE BACILLUS PESTIS,"

By Dr. M. J. ROSENAU,

Of the U.S. Marine Hospital Service.

This brochure of 44 pages emanates from the hygienic laboratory of the Naval Hospital at Washington. The results obtained by Dr. Rosenau by means of his experiments are as follows:—

(1) The oacillus pestis is not a frail organism. It resembles the hemorrhagic septicemic group or the cocco-bacilli as far as its viability is concerned.

(2) Temperature is the most important factor in the viability of the plague bacillus. It keeps alive in the cold, under 19° C., a very long time. It dies quickly, especially when dried, at the body temperature, 37° C.

(3) Moisture favours the life of the bacillus pestis. It usually dies in a few days when dry, even in the presence of albuminous matter, provided the temperature is above 30°. It may keep alive and virulent when dry for months in the cold, under 19° C.

(4) Sunlight kills the organism within a few hours, provided the sun shines directly upon the organism and the temperature in the sun is over 30° C. The effect of sunlight is not very penetrating.

(5) The virulence of the bacillus pestis is often lost

before its vegatability.

(6) It is unlikely that new dry merchandise would carry the infection. The organism usually dies in a few days on the surface of objects such as wood, sawdust, bone, paper, &c.

(7) Clothing and bedding can harbour the infection for a long time and may act as fomites. The bacillus lives for months when dry in albuminous media at

temperatures under 20° C.

(8) Food products may carry the infection of plague. The bacillus lives a long time in milk, cheese, and butter. It usually dies quickly on the surface of fruits and prepared foods.

(9) The organism may live a long time in water,

although plague is not a water-borne disease.

(10) The plague bacillus does not live long on paper, and first-class mail is therefore not apt to convey infection.

(11) The colder the climate the greater the danger of conveying the infection on fomites—clothing, bedding, food, merchandise, &c., and more extensive disinfection is required in such a climate in combat-

ing the disease than in tropical regions.

(12) The plague bacillus is destroyed by sulphur fumigation and by formaldehyde gas in the strengths in which these disinfectants are usually employed. The gases can only be depended upon as surface disinfectants. In disinfecting ships, warehouses, dwellings, and other places infested with rats, fleas, and vermin, sulphur is better than formaldehyde, because formaldehyde gas fails to kill the higher forms of animal life.

(13) A temperature of 70° C. continued a short time is invariably fatal for the plague bacillus. The ordinary antiseptics are all efficacious in their usual strength for nonspore-bearing organisms. Efficient surface disinfection may be accomplished by exposing objects all day to the direct sunshine on warm days. The temperature in the sun must be above 30° C.

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1.—The address of the Journal of Tropical Medicine is Messrs. Bale, Sons & Danielsson, Ltd., 83-89, Great Titchfield Street, London, W.

2.—All literary communications should be addressed to the

Editors.

3.—All business communications and payments should be sent to P. Falcke, Secretary to the JOURNAL OF TROPICAL MEDI-Cheques to be crossed London and South Western Bank, Great Portland Street Branch, London, W.

4.—The Subscription, which is Eighteen Shillings per annum, may commence at any time, and is payable in advance.

-Change of address should be promptly notified.

6.—Non-receipt of copies of the Journal should be notified to

the Secretary.

7.—The JOURNAL will be issued on the first and fifteenth day of every month. Any delay in transmission should be immediately notified to the Secretary.

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Contributors of Original Articles are entitled to six copies of the Journal. If reprints are required they will be supplied by the publishers, if the order is given with remittance when sending the MS. The price will be as below:—

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100 11/0; ,, ,, 200 14/6;

One page of the Journal equals 3 pp. of the reprint. If a printed cover is desired the extra cost will be for 50 Copies, 5/6; 100 Copies, 6/6; 200 Copies, 7/6.

THE

## Journal of Tropical Medicine

OCTOBER 1, 1901.

MISSION OF SIR FRANCIS LOVELL, Kt., C.M.G.,

TROPICAL AND OTHER COUNTRIES.

THE Committee of the Seamen's Hospital Society, on behalf of that Society and the London School of Tropical Medicine, have issued a circular with the above heading. The mission to be undertaken by Sir Francis Lovell is for the purpose of eliciting support and raising funds for the Committee of the Seamen's Hospital Society, so that they may continue and improve upon the good work they have so creditably begun in connection with the London School of Tropical Medicine.

The places set down in Sir Francis Lovell's programme include most of the best known cities and countries in the tropical and sub-

tropical portions of the Empire, and wherever British folk have settled in warm climates.

The several countries it is contemplated to visit are Egypt, Aden, Zanzibar, all the Presidencies and several of the States of India, Assam, Burmah, Ceylon, the Straits Settlements, Perak, Selangor, Negri Sembilan, Pahang, British North Borneo, Brunei, Sarawak, Siam, Labuan, Hong Kong, the treaty ports of China, Peking, Japan, Australia, Tasmania, New Zealand, Fiji, and finally Canada.

The work undertaken by Sir Francis Lovell, although in the highest degree philanthropic and commendable, cannot be regarded altogether as a pleasant task. It is more or less of a begging nature, requiring of the man who undertakes it to be thoroughly in earnest and in sympathy with the spirit of the work. This we know Sir Francis to be, and we are sure he will enlist sympathy in the cause he pleads. He needs not to apologise to those he has introductions to that he comes upon a begging expedition. He asks nothing for himself, he is exploiting no shady financial trust, but appeals for funds to fight illness, and to bring health where disease prevails. No man ever had a more humane cause to plead, nor can any one give to a more charitable work or one calculated to spread its blessings so universally and so directly.

The importance of the cause could have no greater testimony than the fact that Sir Francis Lovell is himself the advocate. After a life spent in the colonial service of his country, after having attained a position in which retirement would be honourable, he neglects the leisure which he has every right to expect and enjoy, and for the good of the profession to which he belongs, and the immediate benefit of his fellow creatures, sets forth upon a difficult task. He has become impressed with the necessity for young medical men being trained for the special form of practice incumbent upon them in warm climates, and with the possibility for good of the London School of Tropical Medicine. There is no man, woman, or child living in a warm climate, be they British or native, who is not directly affected by the cause which Sir Francis pleads. From

the Governor of a State to the humblest coolie, the well-being of all classes is directly benefited by the work of the London School of Tropical Medicine.

It is to be hoped the mission will be successful, and that a sum worthy of the cause and of the Empire will be realised. It is to be hoped that every resident in Greater Britain will have the opportunity of contributing either directly or indirectly to this fund, for it is at once his or her duty and privilege to do so. Medical men can help perhaps most of all, and were we to suggest a course for them to pursue, we would recommend that, in every town where Sir Francis is expected, a local committee be formed, whose duty it would be to receive him and advise him as to the best course to pursue.

This plan would lighten labour, hasten the journey, and by lessening expenses improve directly the profits. Where the cause is difficult to plead, entertainments of various kinds might be possible, and in various ways can every community have the claims of the mission brought before it. Medical men need have no hesitation in bringing forward this great cause to their fellow residents and neighbours. Never did a more humane or catholic mission leave the shores of Britain. It has for its purpose the well-being of the greater part of the human race, irrespective of creed, colour, or nationality. Nor are the benefits which must accrue visionary or remote, for recent investigations in tropical hygiene and pathology have shown us how direct and immediate are the results of investigations. Therefore let no one hesitate to help the special advocate being sent out by the Committee of the Seamen's Hospital Society, least of all medical men. Their advocacy should be no mere passive support, no apologetic introduction of Sir Francis to those amongst whom they live and practise, but it is their duty, and we are sure it will be their pleasure, to prepare the way for his coming and explain what his mission means.

## Article for Discussion.

# THE DANGER OF SUBCUTANEOUS INJECTION OF QUININE.

By R. M. TOWNSEND, M.D.Aberdeen. Bulawayo, Rhodesia, South Africa.

I FIND it frequently stated in text-books and articles on "The Treatment of Malarial Fever," that the intramuscular injection of a solution of quinine is the most reliable method of treatment.

Now I should like to know whether abscesses and necroses of skin over the sites of injection are often met with?

I have had two rather troublesome cases lately, resulting from such treatment, even after the most careful sterilisation of syringe and solution, as well as of the skin by the sister in charge of the ward. One patient had frequent hypodermic injections of strychnine at the same time, as he was in a very weak condition, yet these injections showed no signs of inflammation whatever.

The solution of quinine used was that described by Benson\* in Dr. Manson's "Tropical Diseases," as none of the more soluble salts could be obtained.

In one patient—a phthisical subject with gastrointestinal catarrh—two injections were given, and a slough the size of a shilling formed over each injection. In another a slough of the same size formed, and in addition he had two abscesses.

I should like to know what the experiences of others are, as mine has not been very encouraging.

REMARKS UPON THE DANGER OF SUBCUTANEOUS INJECTION OF QUININE.

In order to further enquiry on the subject brought forward by Dr. Townsend, namely, the

<sup>\*</sup> Benson's method is referred to in Dr. Manson's book as follows:—

<sup>&</sup>quot;Benson (Trans. First Indian Med. Cong.), speaking from an experience of 1,390 cases, says that the hypodermic injection of quinine is by far the most effectual, as well as economical, way of treating malarial fevers. He used the sulphate dissolved in water with the aid of hydrochloric acid, the strength of the solution being fifteen grains to the drachm; of this he injected twenty minims between the scapulæ, or into the outer surface of the arm. In 614 consecutive cases so treated not a single untoward accident occurred, one injection usually sufficing."

untoward results of subcutaneous injection of quinine, I submit my own experiences.

Most of the practitioners who have traduced this method of treatment have been accused of carelessness and uncleanliness, and their attempts at protest, or at calling attention to the formation of abscesses, have been thus silenced. This is a most unfair accusation, but up to the present it seems to have been most effectual in stifling discussion of the subject. The result, of being told that it is septic and therefore uncleanly manipulations that have brought about the necrosis of skin or caused subcutaneous abscess, has been that the person so accused has dropped the method of treatment and, for him, there the matter ends. If hypodermic methods of treating malaria by quinine are as effectual, simple, and beneficial as the enthusiasts of this line of treatment declare them to be, how is it that this plan of administration is not more often practised? I hope that every one who sees this article of Dr. Townsend's will record his experience in this matter whether for or against the hypodermic use of quinine. I was prejudiced against its use by seeing the results in the practice of other medical Whilst I resided in Hong Kong several persons (five or six) came to me with abscesses on the outer aspect of the left forearm. They all gave the same story, that they had been treated by a French physician practising in the French possessions in the "Far East," who employed subcutaneous injections of quinine for the treatment of malarial fever. The abscesses were most troublesome; they were much larger than those referred to by Dr. Townsend, measuring as a rule just over three inches in diameter, and as they were circular and the abscess penetrated deeply, even through the deep fascia, the severity of the ulceration may be imagined. The process of healing was slow, several months elapsed before the limb could be freely used, and the size and ungainliness of the scar caused a permanent disfigurement. It was by seeing these cases that I conceived a dislike to the subcutaneous injection of quinine, and except under very exceptional circumstances I gave it up.

JAMES CANTLIE.

# Translations.

# A CASE OF FOREST YAWS (Pian bois).1

By MM. DARIER AND DE CHRISTMAS. (Translated from the French by P. Falcke,)

M. G., male, aged 32, has always had good health, with the exception of an attack of typhoid fever when he was twelve years old. He never had syphilis. He made three journeys into the interior of Guiana, in 1895-1896, in 1897-1898, and in 1900-1901. He had numerous attacks of malarial fever during his two first journeys, but they were less frequent during his third journey, thanks to the prophylactic use of quinine. Since his return to Europe he has had no more malarial attacks.



M. G.'s actual disease dates from the time he left the great forests of the interior of Guiana at the commencement of the rainy season (February 1st, 1901).

The commencement of the illness was announced by the appearance of a small node of a violet colour;

<sup>&</sup>lt;sup>1</sup> The illustrations accompanying this article were made from a photograph by M. Meheux, and are reproduced in the JOURNAL OF TROPICAL MEDICINE by the kind courtesy of the Editor of Le Caducée.

it was non-ulcerative, slightly indurated, and had its seat on the back of the right hand. A short time afterwards a similar place developed on the left forearm. These excrescences began some days afterwards to ulcerate, and developed into two superficial ulcers about the size of a sixpenny piece.

On arrival at Cayenne, on March 1st, 1901, the ulcerations, slightly increased in size by then, were recognised as the lesions of forest yaws, a disease very common at the commencement of the rainy season amongst prospectors, the workers in clearings, and



foresters. The disease is quite unknown to Europeans who have never penetrated the virgin forests. In Dutch Guiana it is designated boussy-yassi.

The lesions were treated at Albina Hospital (Maroni), on March 19th, 1901, by means of curetting with the sharp spoon and the application of various antiseptics. The ulcer became still further enlarged under this treatment to the dimensions of a crown piece, while remaining atonic, in spite of cauterisations with nitrate of silver. In addition, other nodules, but not ulcerations, developed on both arms, as well as chains of small indurations along the course of the lymphatic vessels of both arms.

The patient adopted various methods of treatment,

such as prolonged sea baths, iodide of potassium (5 grs. per diem) &c., but without amelioration.

By the advice of a specialist at New York, the dressings of sublimate were changed for ichthyol, but with no better effect.

The treatment commenced in Paris on May 26th, 1901, consisted of the application of the actual cautery to the entire surface of the ulcerations and the daily application of our ointment of the following ingredients:—

 Perchloride of iron
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 Vaseline
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 Lanoline
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This treatment, renewed night and morning, caused the sores to heal quickly.

The general health of the patient is good. The blood examination exhibited no abnormality. The liver and spleen are of normal size. The constituents of the urine are normal.

The bacteriological examinations of the pus from the nodules, commenced in Paris a few days after the patient's arrival, have as yet yielded no specific results.

Some tissue removed by tweezers has been examined by M. Darrier from a histological point of view, but the result of this examination has been negative.

Cultures and inoculations on animals made by M. de Christmas remained sterile. At the present time all the ulcerations are healed. Along the lymphatic vessels there are still some nodules, but they do not exhibit the slightest tendency to ulceration.—
Le Caducée, August 3rd, 1901.

# UGANDA PROTECTORATE—REPORT FOR THE YEAR ENDING DECEMBER 31, 1900.

By Dr. R. U. Moffat, C.M.G.

Principal Medical Officer.

(Abstract.)

# PRELIMINARY OBSERVATIONS.

THE Uganda Protectorate includes a large tract of country, different parts of which differ entirely in their climatic conditions, varying from the cold and healthy altitudes of the Mau Escarpment to the hot and malarious shores of the Victoria Lake and Nile Valley.

The majority of our patients are natives in Government employ, who are not actually aborigines of the country; we are therefore dealing with people alien to the country.

Women and children seldom come under our notice, except at a few stations where there are settlements in which the wives and families of the men live.

For these reasons, I lay stress on the fact that the conclusions arrived at in this Report must be received with some reserve.

# GENERAL HEALTH OF EUROPEANS.

Ten European officials have had to be invalided tem-

porarily or permanently as follows:-

Three after recovery from blackwater fever; one for malarial neuritis and phthisis; one for rheumatism after nine months' residence in the country. The patient had suffered from the disease previously. One for appendicitis; one ulcer of the stomach; one suspected

phthisis after eight months' residence in the country; one debility following diarrhaa, complicated with piles and fissure : one anal fistula and debility.

There have been four deaths among the European

officials:

Two from blackwater fever; one suicide during

blackwater fever; one killed in action.

Amongst the members of the different Missions there have been two deaths, both from blackwater

#### SPECIFIC MEDICAL DISEASES.

(a) Malaria.—As has already been stated, malaria is endemic through the whole of the western portions of the Protectorate comprising the districts of the Lake level and the Nile Valley.

The types of fever commonly met with are the tropical quotidian and tertian, the latter more

commonly among Europeans.

The benign tertian and quartan forms are seldom met with. The disease, if properly treated at the outset, even among Europeans, seldom assumes malig-

nant features, except hæmoglobinuria.

Occasionally, among Europeans, the disease assumes a prolonged remittent and almost continuous course. but I have generally found that in these cases quinine had not been administered in proper doses at the beginning. For the most part, the common attacks in this country last for two, three, or four days. Personally, I am adopting the routine practice that if on the third day the temperature still shows a disposition to remain high, I at once exhibit quinine hypodermically. So far I have found that this invariably cuts short the attack.

# BLACKWATER FEVER.

By far the most important and dangerous form of malaria is that complicated with hæmoglobinuria, the so-called blackwater fever. Previous to the year 1900 blackwater fever had almost been unknown in Uganda proper, while Unyoro was looked upon as a hot-bed of the disease. During the past year, however, quite a large number of cases have occured in Uganda, but only one in Unyoro.

ONSET AND CLINICAL COURSE OF THE DISEASE.

The patient has generally been suffering from malaria more or less severely. Some morning, feeling better, or at any rate not bad enough (in his opinion) to warrant remaining in bed, he proceeds to get up and probably goes about his duties. A few hours after blackwater fever supervenes. With the onset of the hæmoglobinuria here is usually a severe shivering fit. Headache and pains in the back, severe and persistent vomiting, the ejected matter often being a slimy green stuff not unlike chewed grass, and suppression of urine.

The patient often becomes rapidly jaundiced, a

symptom which I am inclined to look upon as a somewhat grave one. Three or four days is the usual duration of the disease, but it may be much shorter,

or in rare cases much longer.

Prognosis.—The following number of cases have occurred during the year 1900, including the latter three months of 1899.

- (a) European officials, fourteen cases with three deaths.
  - (b) Traders, two cases with no deaths.
  - Missionaries, eleven cases with two deaths.

Indians, fifteen cases with four deaths.

(e) Natives, one case with no death.

Treatment.—I am of opinion that quinine should be given speedily and in large doses. All the medical officers in the Protectorate, who have met with the disease, agree with me in this.

Owing to the severe vomiting it is generally impossible to give the quinine, and, in fact, any medicines by the mouth. In my experience rectal administration of the drug has not proved a success, but we have in intramuscular injection a safe and rapid

method for introducing quinine into the system.

I will therefore shortly point out the method that should be followed. In the first place it should be remembered that it is not a hypodermic injection but an intramuscular one, and suitable sites should be chosen. My favourite position is the buttocks or the muscles between the shoulder blades. The arms and outer sides of the thigh are not good positions.

(1) Boil a syringeful of water in a test tube or

spoon.

(2) Add the quinine, and, if any difficulty in dissolving, heat again. I avoid boiling the solution as for aught I know some decomposition of the drug may result. The solution should be perfectly clear before injecting it.

(3) Fill the syringe and affix the needle in the ordinary way. When ready dip the needle up to its base in pure carbolic acid and keep it there for a minute. Then, without wiping off the carbolic, plunge the needle in vertically, having first rubbed the sight with a little antiseptic lotion.

(4) Remove the needle quickly after injection, which

should be performed slowly.

I use a large-sized syringe of 2 drachms capacity, and this will dissolve 25 grains of the hydrochlorate of quinine powder without any difficulty. In regard to further treatment the patient should be kept warm in bed. I recommend free drinking of barley water, rice water, soda, weak tea, and such-like bland liquids.

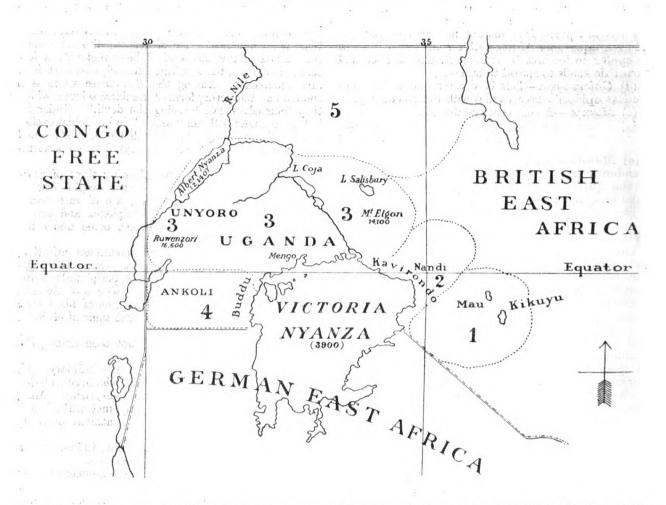
The vomiting persists even if the stomach is empty, when painful retchings result. For this reason also I think it wise to encourage the patient to drink as

much as he can.

Small doses of morphia either hypodermically or by mouth at times seem to relieve the vomiting to a certain extent. No other drug has the slightest effect. The state of the heart has to be carefully watched and suitable stimulants, such as strychnine, should be given hypodermically.

Prophylaxis.—I am firmly of opinion that one single rule exists which, if followed, would prevent many cases of blackwater fever. No patient, especially if he has suffered much from malaria, or has been in the country for some time, should ever be allowed out of bed until his temperature is and has been normal for at least twenty-four hours. In my opinion it is the low temperatures which are most dangerous, and a chill acting at this stage will bring on hæmoglobinuria.

(b) Measles.—I have not come across this disease



DESCRIPTION OF THE DIFFERENT DISTRICTS INTO WHICH THE UGANDA PROTECTORATE MAY BE DIVIDED FROM THE POINT OF VIEW OF HEALTH.

1. The Mau District.—The country round is hot and dry, and the rainfall uncertain. The nights are bitterly cold, the elevation being 6,500 feet. A great feature of the Valley of Lake Naivasha is the strong wind, which almost invariably rises about nightfall. It rushes off the Kikuyu Escarpment (8,000 feet) from the east, and blows continuously until the early hours of the morning. The climate is healthy, and, as far as Europeans are concerned, there is little sickness. Malarial fever is, I think, not endemic

Mosquitoes abound along the lake shore, but none of them, as far as my knowledge extends, belong to the genus Anopheles.

The District of Nandi.—It is in every way a magnificent tract of country, well watered, well wooded, and possessing a beautiful climate.

The days are warm, but never oppressively so, and the nights are bitterly cold. The elevation varies from 6,000 to 8,000 feet. Malaria does not exist, and, in my opinion, the country is one perfectly suitable for European colonisation.

3. Districts of the Lake level.—The general altitude is a little over 4,000 feet, and through all this district malaria is rife and mosquitoes abound. The shade temperature seldom exceeds 90° F. The nights are cool, with heavy drenching dew. The physical characters of the country in the eastern portion of the district differ entirely from those of the western.

The Kingdom of Uganda is a country consisting of a succession of small hills in the valleys between which papyrus swamps with sluggish stream flow slowly Lakewards. The vegetation is rank. Mosquitoes exist in myriads.

Malaria is common at all times and seasons.

I have found a specimen of the Anopheles, but have not yet been able to trace their breeding haunts. Blackwater fever occurs throughout the whole district of the Lake level, but until this year was not common in Uganda itself.

In conclusion, I would say, in regard to the region of the Lake level, that, though no doubt highly malarious, it is not deadly, and in the future, with improved conditions of life and accommodation, Europeans should be able to live with little damage to their health.

- 4. Districts of Ankoli and Toru.—Both places have a good reputation as regard their healthiness, and no serious illness has been reported among the officials stationed there.
- The Districts of the Nile Valley.—Under this term I include that part of the Valley of the Nile north of the Albert Lake; it is much hotter than Uganda, and there is no doubt it is even more malarious. Five cases of blackwater fever have occurred during the fourteen months ending December 31st, 1900, which is a high average considering the small number of Europeans resident there.

in the Uganda Protectorate, though it does, to my

knowledge, occur nearer the coast line.

(c) Small-pox.—This disease is probably endemic all over equatorial Africa. At certain times it takes on epidemic features in some particular district, and from this tends to spread to others.

(d) Chicken-pox. This is at times one of the commonest epidemic diseases met with in this country.

(e) Mumps.—A very common disease.

(f) Dysentery.—True dysentery is not a common complaint in the Uganda Protectorate now that the

days of large caravans are over.

Many cases are returned in reports under this heading, but I am inclined to think that a large percentage belong to the mild catarrhal form, which is more in the nature of a simple diarrhœa with some blood in the motions.

(g) Frambæsia or yaws.— The loathsome disease is exceedingly common in Uganda itself, and in the northern and western parts of the Protectorate. It has not been reported to me by any of the medical officers east of the lake, but I have seen one or two cases myself in Kavirondo. Hence, as it exists on the coast line, I am inclined to think that it is probably universal throughout East Africa.

(h) Leprosy.—I have met with a few cases of this disease, chiefly among the Soudanese; but I am unaware whether it exists to any great extent among the Waganda or other aboriginal tribes. The type most frequently seen is the anæsthetic and macular. In only one case have I observed the tubercular form

of lesion.

(i) Plague.—I am unable to say with certainty whether this disease exists in Uganda. I have myself never come across it in any shape or form. It has been reported to me several times as being active in Buddu (south of Uganda), on the German frontier.

It appears that about ten years ago a virulent epidemic, called by the Waganda "kaimpulle," swept through the whole of Uganda. From the accounts given to me by missionaries, it would appear to have been either bubonic plague or something like it. Since that time the Waganda ascribe the name of "kaimpulle" to any disease which acts swiftly, and to them mysteriously, especially if it is fatal. I have on more than one occasion had patients brought to me as cases of kaimpulle, but on examination they proved to be suffering from some other easily recognisable disease. I am therefore inclined to discredit the reports received from native sources.

It would appear, however, from researches and observations made by the Germans, that the plague bacillus does exist in their territory. It is therefore possible that the disease may be lingering in South Uganda in a subacute or chronic form, showing itself only in sporadic cases.

(j) Beri-beri.—I have not seen this disease in the Uganda Protectorate, though it occurs, I believe, on

the coast.

(k) Enteric, cholera, scarlet fever, and diphtheria are, in my experience, unknown diseases in East Africa.

(l) Influenza.—An epidemic of this disease occurred in Uganda during the months of June, July and August, 1900. It also spread to Unyoro, but was not

reported elsewhere. Judging by native reports, it

proved very fatal among the Waganda.

Diseases of the nervous system.—In my experience there is a singular absence of nervous diseases among the natives of this country. I have met with a few cases of epilepsy, but speaking generally, insanity is of rare occurrence. Among the Soudanese there is a sudden and temporary form of maniacal seizure, which they themselves call "seeing the devil." Under its influence a man will run "amok" in homicidal excitement. The following day he will be quite sane, and will profess entire ignorance in regard to his performances.

I have seen but few cases showing signs of gross nerve lesions. Paralysis of central origin due to emboli, thrombosis, or apoplexy, are of rare occurrence. One or two cases of hemiplegia, and one of paraplegia of syphilitic origin have come under my notice.

Facial paralysis is not an uncommon affection, especially as a sequela of malarial fever. The prognosis is good. One case of malarial peripheral neuritis occurred this year in a European, who was attacked by severe malaria within two months of his arrival in the country. The patient had also signs of phthisis, and he was at once invalided.

Chorea is a disease I have not seen among the

natives of this country.

Diseases of the respiratory organs.—Ordinary colds and coughs are excessively common, which, considering the habits of the people, is not surprising. Mild, dry pleurisy is also very frequently met with, but is easily curable by the ordinary treatment of a fly blister.

Pneumonia is a common complaint, and one which

very often ends fatally among the natives.

Phthisis.—There have been a large number of cases of this disease among the garrisons (both civil and military) of the stations in the districts of Mau and Nandi.

I am not aware whether phthisis exists to any great extent among the Waganda. I have had this year three cases of the disease in Kampala, all of which proved fatal. The patients were all prisoners confined to the gaol in Kampala, and undergoing long terms of imprisonment.

The circulatory system.—In my experience diseases of the circulation are usually rare, but this may be due to the fact that the majority of our patients are strong,

healthy men, in the prime of life.

As will be mentioned later kidney disease is rare, and, owing to all these reasons, it is not a matter for surprise that the circulatory system to a great extent escapes the diseases common among civilised people.

Organs of digestion.—Disorders of digestion and the alimentary system generally are the commonest affections which come under the notice of a medical man in this country, owing, of course, to the gross

and filthy habits of the natives.

Chronic dyspepsia, gastritis, diarrhea and colic are excessively common. Diseases of the liver are, on the other hand, somewhat rare. Mild congestion and hepatitis occasionally occur, but cirrhosis rarely. One case of biliary colic, due to passage of gall stones, was under my treatment this year, but it was the first

I had seen in the country. Liver abscess is not very common. I have had one case this year in a native, but no others have been reported. Constipation is a common complaint among Europeans, but natives are seldom troubled with it.

Sprue I have not met with.

Intestinal parasites abound, chiefly Tania saginata and Ascaris lumbricoides. It would, I think, be within the mark to say that 75 per cent. of the population harbours one or other of these parasites.

Anchylostoma I have seen but once, and that several years ago. The patient was a Swahili and it is possible that he had contracted it elsewhere than in Uganda.

Spleen and blood.—Enlargements of the spleen, as would be expected, are very common. In making post-mortem examinations I have invariably found the spleen enlarged, whatever the disease may have been

which killed the patient.

Most of the children and young people also suffer from enlargement of the organ, in some cases to an enormous degree. It is, of course, difficult to follow the course of such cases, and I am not aware what happens as the child grows to maturity. The enlarged spleen of leucocythemia I have not seen in this country.

Anamia.—Simple anæmia is a common symptom

both among the Europeans and natives.

Pernicious anemia I cannot say that I have seen

in this country.

Urinary organs.—Affections of these organs are

Organs of locomotion.—Rheumatism in the form of acute fever does not, I think, occur in this country. I saw one case (European) some years back, but the patient had only been two months in the country and he had suffered from the disease previously.

Acute localised arthritis as the result of injury or exposure to wet is not uncommon; also tenosynovitis

and muscular rheumatic pains.

Rheumatoid arthritis as the result of injury or exposure to wet is not uncommon; also tenosynovitis

and muscular rheumatic pains.

Rheumatoid arthritis is also occasionally met with. Gout is a disease I have not seen among the natives of East Africa.

Rickets is also in my experience an uncommon affection.

Skin diseases.—The two commonest recognisable diseases are eczemas of all kinds and a disease which I call itch, but which is certainly not due to the Acarus Sarcotes hominis. It is excessively common all over East Africa. One of my colleagues who has been on the West Coast informs me that it is, in his opinion, identical with the disease known there as craw craw.

Herpes of all kinds is not uncommon. Pemphigus I have occasionally noted.

Psoriasis of a non-syphilitic nature I have never seen occur, and I have never recognised any of the different forms of tinea, though a case of tinea imbricata has been reported to me.

In regard to pediculi, only two are found, viz.:

P. vestimentorum and P. pubis.

As far as I know, true lupus does not occur in this country. As is well known, the black races are particularly prone to the development of keloid, and many strange and fantastic examples of this condition are often seen, produced either by accident or design.

Leucoderma is also a common condition amongst the natives of East Africa generally. It appears to be progressive, but to produce no other obvious evil results.

The surgical part of Dr. Moffat's report will be dealt with in the next issue of the Journal, and a summary in tabular form of the information conveyed

# Correspondence.

PREPONDERANCE OF FEMALE MOSQUITOES.

To the Editor of The Journal of Tropical Medicine.

SIR,-There are one or two points connected with the life-history of mosquitoes which perhaps Mr. Theobald would be able to explain.

The first thing that strikes an investigator is the extraordinary preponderance of females. There does not appear to be one male in a thousand specimens. Mr. Theobald say what proportion of males and females are hatched; what becomes of all the males so quickly; and where impregnation takes place?

I am referring to the Culex genus chiefly, for in Anopheles there appears to be much less disproportion in the numbers of the sexes. Incidentally I may mention that I have found the following specimens of the genus Anopheles within the past two years:—A. albitarsis (F.), A. funestus (M.), A. fuliginosus (F.), A. Rossii (F.).

I am, yours truly, e. A. B. Dalgetty, C.M., M.D. Madabpore Tea Estate, South Sylhet, India.

A BERI-BERI EXPEDITION.

For some time it has been reported that an expedition to study Beri-beri was to be sent out by the London School of Tropical Medicine. It would now appear that the money necessary to defray the expenses of the expedition has been generously contributed by the Christmas Islands Phosphate Company, of Billiter Street, London, E.C. The sum of £1,000 has been granted by the Company and free passages to all the members of the expedition. Sir John Murray has also given a donation of £100 for the same purpose. The Colonial Office is stated to be prepared to make a grant in aid of this expedition. The members of the expedition are to sail from Cardiff on October 4th.

On referring to the map it will be noted that there are two Christmas Islands, both British possessions; one is situated in the Indian Ocean some 240 miles off the south coast of Java; the other belongs to the Central Polynesian Sporades in the Pacific Ocean. It is the group of islands off the Java coast that is the destination of those engaged in the Pacific Ocean.

in the Beri-beri expedition.

EXPERIMENTAL MALARIA: RECURRENCE AFTER NINE Months.—Dr. Thurburn Manson, as a result of the bites of mosquitoes fed in Rome on a case of benign tertian ague, developed a double tertian fever. The first symptoms appeared after an incubation period of between ten and sixteen days. The illness lasted four days, when the presence of the parasite having been fully confirmed, ten grains of quinine were given. This drug was given from time to time for the next three months. Dr. Manson kept in normal health for nine months, when prodromal symptoms of illness developed, and a definite malarial paroxysm again occurred. This attack proved to be simple benign tertian malaria, the original infection being of the double tertian type.

# Current Titerature.

# EPIDEMIC BALDNESS IN JAPAN.

DR. LOUIS ELKIND makes the following interest-ting communication about an epidemic of baldness which is at present affecting some parts of Japan. A large number of women have already suffered in this way; indeed, there was an epidemic of baldness at Chiba last year, and there has been an even more serious one quite recently at Osaka, the same province where, as it will be remembered, an extensive epidemic of plague which subsequently assumed a most formidable and alarming character, prevailed during the last months of 1899 and at the very beginning of 1900. The clinical course of the affection under consideration offers many points of interest, and differs eminently both as regards extent and character from the occurrence of sudden baldness, say, for instance, after enteric fever or any other acute feverish attack. For it is stated that during the epidemic of baldness, the loss of hair comes to women (and to men also) after very little if any premonitory warning. The scalp, to all appearances, may be quite healthy, and as far as external examination is concerned, no morbid signs can be detected, and there may be no symptoms either of actual illness or even of slight indisposition; but a woman may find when she combs her hair soon after rising in the morning that it falls out in remarkable quantities, and soon she is partly, if indeed not quite, bald. Or it may be that for some little time, as it has been observed in some of the more acute and severe cases, there have been disturbances of vision, a feeling of vertigo, diminished appetite and digestive troubles, though none of them are well defined or present any definite character; it may, however, be added that in some cases at least a slight rise of temperature has preceded the infliction. The effects of the disease exhibit several interesting peculiarities. The bald patches are irregularly spread over the head, but the first large one generally appears on the crown, and extends down the back of the head instead of forwards towards the forehead; thus it may happen that the back of the head is quite bald and the front covered with hair, the opposite of course to the baldness which is common in Europe. Then also men's beards are ravaged in a peculiar manner. The left cheek, for instance, may be completely deprived of hair while the rest of the beard is as usual and the moustache is left untouched, indeed the moustache is but rarely affected. Another point which may be noticed is that most of the victims of the epidemic are women, and more children are attacked than men. Strange to say, it is the men in the prime of life who suffer, not those who are advanced in years. The old men seem to be immune, for no case is reported of a man who had white or grey hair suffering any loss, and yet such is the eccentricity of the disease that fair men suffer much more than dark men, and dark women much more than their blonde sisters. The cause of this curious epidemic is very difficult to determine, indeed there is no really satisfactory explanation of it. Some of the physicians think that the Europeans are affected by the climate, and others that the water is the cause of the trouble, whilst others again, incline to the belief that the disease is parasitic. Little wonder, therefore, that in view of this uncertainty the various methods of treatment, both preventive and curative, are unsatisfactory. There is an opportunity for a physician, native or foreign, to earn for himself great distinction.—The Spectator, August 24, 1901, p. 251.

#### LEPROSY.

TREATMENT OF LEPROSY.—Dr. de Moura, of Sao Paulo, Brazil, is using the venom of the rattlesnake in the treatment of leprosy. It is injected in gradually increasing doses and simultaneously an antitoxin serum is used. No results can as yet be given as the treatment has not been used for a time sufficient to ensure success or otherwise.

Dr. Dyer, of New Orleans, suggested the employment of Calmette's antivenene in the treatment of leprosy in 1897, and it has since been adopted in the laboratory of the Army of the U.S. at Manilla.

#### ORGAN THERAPY IN CHINA.

Dr. Bouffard, in an interesting article published in Les Annales de Medicine Coloniale, gives an idea of the general treatment of common ailments by means of organ therapy. The juice expressed from the lungs of pigs is given for chest complaints; the intestines of pigs for dysentery and diarrhea; its brain for migraine. As the Chinese doctors have no knowledge of hypodermic injections all the remedies are given by the mouth. Their ignorance of anatomy also, causes them to neglect the use of certain active organs, such as the ovaries and the thyroid gland, but on the other hand, urine is taken internally in order to promote the circulation of the blood and to accelerate labour. The best remedy supposed to give strength to the parturient is to give her the placenta to eat, either in its natural state or dessicated and made into pills.

#### YELLOW FEVER.

On July 5th, the Senate sitting in Paris adopted the suggestion to credit the Colonial Minister with 100,000 francs to be devoted to the organisation of a scientific mission having for its object the study of yellow fever.

The Propagation of Yellow Fever. — In an address delivered at the Annual Meeting of the Medical and Chirurgical Faculty of the State of Maryland, and published in the Medical Record, August 10th, 1901, Walter Reid, M.D., Surgeon U.S. army, gives a detailed account of observations and experiments made in Cuba in connection with the propagation of yellow fever. A summary of the elaborate paper may be stated as follows: (1) Yellow fever is not communicable by fomites; thus persons sleeping in infected clothing within infected dwellings when protected from mosquitoes did not contract the disease. (2) Persons bitten by mosquitoes in an infected mosquito building, or by mosquitoes fed on patients suffering from yellow fever frequently (ten out of thirteen cases) developed the disease. (3) The subcutaneous injection of blood taken from the general

Il Policlinico.

circulation of persons suffering from vellow fever produced yellow fever in the three cases experimented upon. The quantity of blood injected in these three cases was 1.5 cc., 0.5 cc., and 1 cc. respectively.

(4) The production of yellow fever by subcutaneous injection is of much scientific interest-first, as serving to confirm what the mosquito inoculations had already shown, viz., that the parasite is present in the general circulation; second, that passage through the body of the mosquito, although this would seem to be nature's method, is not absolutely essential in the life history of this micro-organism; and third, that the period of incubation of the disease, when thus produced, corresponds fairly closely to that occasioned by the mosquito's bite. A point of considerable importance brought out by the blood injection was the absence from this blood, on careful bacteriologic culture, of any bacterium which grows on our ordinary media by aerobic methods; thus excluding absolutely the bacillus icteroides of Sanarelli from further claim as the specific agent of yellow fever.

CRUSADE AGAINST MALARIA AT CONCORD. - During the past few days Dr. Doty, health officer of the port, has begun an active crusade against malarial fever at Concord, borough of Richmond, in the vicinity of the quarantine station, where the disease prevails to a very large extent. A systematic inspection of individual homes is being made by a detail of policemen, with a view to correcting injurious conditions, and crude petroleum put in all the stagnant pools in the district. Dr. Doty is of the opinion that the mosquito larvæ remain at the bottom of the water most of the time, and he has designed a special apparatus to force the oil down to the bottom and spread it thoroughly there. The oil will naturally rise to the top later, so that he expects to accomplish all that is done by others in depositing it on the surface, and more, if possible. A careful investigation of the mosquitoes found in the region is also being made.—Boston Medical and Surgical Journal, August 8th, 1901.

# EXCHANGES.

Archiv für Schiffs u. Tropen Hygiene. Archives de Medicine Navale. Archives Russes de Pathologie, de Médec., Clinique et de Bacteriologie. Australasian Medical Gazette. Boletin de Medicina Naval. Boston Medical and Surgical Journal. Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology. British Medical Journal. Brooklyn Medical Journal. Caducée. Climate. Clinical Journal. Clinical Review. Giornale Medico del R. Esercito. Hongkong Telegraph.

Annali di Medicina Navale.

Indian Engineering. Indian Medical Gazette. Indian Medical Record. Janus. Journal of Balneology and Climatology. Journal of Laryngology and Otology. Journal of the American Medical Association. La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal. Medical Brief. Medical Missionary Journal. Medical Record. Merck's Archives. New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyclinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo. Sei-i-Kwai Medical Journal. The Hospital. The Medical and Surgical Review. The Northumberland and Durham Medical Journal. Treatment.

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2.—Manuscripts sent in cannot be returned.

3.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

4.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

5.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Editors.

6.—Correspondents should look for replies under the heading "Answers to Correspondents."

# The Journal of Tropical Medicine.

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In order to meet the constant enquiry for addresses of respectable firms catering for the various requirements so difficult to obtain abroad, we give a list of names and addresses which we trust will be found useful to our numerous correspondents and subscribers.

# Original Communications.

#### CHAPPA.

By Edward H. Read, M.R.C.S., L.R.C.P. Lagos.

THE disease called chappa by the Popo people, in the western district of the colony of Lagos, seems to me to be a specific ailment, and one which I have not seen described in any of the text-books.

I have had six patients, two male and four female, during the last two and a half years I have been in

charge of the district.

Signs and Symptoms.-The patients all give the same history. The disease commences with severe pains in the limbs, muscles and joints. After a few months the pain decreases and some joints begin to swell and convey the sense of fluctuation. About the same time nodules develop in different parts of the body. These nodules are in the subcutaneous tissue, and are about the size of a pigeon's egg. After a time, without the formation of an abscess, the skin over the nodule ulcerates and exposes a circular or oval ulcer with a fatty looking base. The nodules may be single, but are more often multiple, and may be so close together that when ulceration ensues the ulcers coalesce forming a serpiginous ulcer. Sometimes the nodules are absorbed without proceeding to ulceration. The ulcers are very chronic and last for years, sometimes healing in one place and gradually extending in another. The joints I have seen most affected are the knee, elbow and wrist. The sense of fluctuation was so marked in one case that I opened the joint, but no fluid exuded, a fatty looking material protruding through the incision. The disease after a time attacks the bones, and the joints may become totally disorganised.

Treatment.—I have tried various kinds of treatment with doubtful success. Iodide of potassium and

perchloride of mercury have been exhibited for months but with very little improvement. A long continued course of arsenic seems to have done good in one case.

The ulcers themselves I have treated by scraping, applying sulphate of copper, pure carbolic acid or izal. Some of the ulcers have healed well, but the disease has broken out again in other parts of the body.

I should be obliged if any of your readers could give

me any information of this disease.

In my opinion it is neither tubercular or syphilitic. There may be some connection between it and rheumatism, which is so common among the natives in this district, the place being very damp and surrounded with swamps.

I have examined the blood of these patients, but with a negative result except in one case in whom I found the malignant malarial parasite. Up to the present I have not had the chance of examining a case on the post-mortem table.

I send you a photograph of four patients, which I am sorry to say is not very clear. I also append the

history of each case, beginning on the left.

(1) Wuru, Hausa, aged 35, male. Five years ago he had acute rheumatic-like pains in all his limbs which lasted for some months. The right wrist then began to swell, and a small lump formed over the back of the forearm. After a time the skin gave way and a circular ulcer formed. During the next few months other lumps were formed in the forearm and back of the hand; these in turn became ulcers.

I saw him for the first time in May, 1899. He had then been ill for over two years, and the whole of the right forearm was a mass of ulceration which had a fatty looking base. I gave him liq. arsenicalis mv. three times a day, cleaned the ulcers with carbolic acid, and applied boric ointment. He gradually improved, and now there are only one or two small ulcers left near the elbow.

(2) Phebe, Popo, aged 50, female. Three years ago she suffered from acute rheumatic-like pains for some months. The left knee then began to swell; after a time the skin on the outer side of the patella burst, but no fluid exuded; a small ulcer formed which gradually healed, leaving the cicatrix which is seen in the photograph. About the same time nodules formed over the inner end of the left clavicle. These ulcerated and extended to the bone.

I saw her first six months ago, when she came to me because her left elbow was swollen. I examined it carefully, and was so positive that I detected fluid that I opened the joint, but to my surprise no fluid came out and the incision was filled with a fatty looking material. I gave her iodide of potassium and arsenic, but after a few weeks small nodules were formed just below the elbow; these soon became small ulcers with the same peculiar fatty looking base. These I scraped, but they have not healed well. About a week ago the left knee became painful and again began to swell. To the touch it feels as if it were full of fluid. This I am painting with iodine. There are also marks of old scars over the two shoulder blades and the skin is adherent to the bone.

(3) Afosewe, Popo, aged 40, female. About eight or nine months ago she had severe rheumatic-like pains, and five months ago nodules formed over the right elbow and left abdomen. She came to me three weeks ago, and there were nine small ulcers around the right elbow joint, which is considerably enlarged. The left side of the abdomen is a mass of ulceration. They are all superficial and are improving under

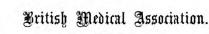
treatment. (4) Sosi, Popo, aged 45, female. Some years ago she suffered from severe pains in the joints and limbs. After some time nodules were formed in different parts of the body, notably the scalp. One over the frontal bone proceeded to ulceration, which extended down to the bone. This healed after many months, but the external plate has exfoliated and the skin is tightly adherent to the bone over the whole surface. I saw her first eight months ago, when she had ulcers on the right arm and left shoulder. I gave her iodide of potassium and perchloride of mercury and scraped the ulcers. The ulcers have nearly all healed, but two months ago she developed a nodule in the scalp which has since become absorbed. About the same time three nodules were formed in the left axilla, one of which became absorbed but the other two proceeded to ulceration. These have gradually healed, but at present she has five nodules in the scalp which are very painful, and are situated over the two parietal and occipital bones. They are not shown in the photograph.

Of the other two cases, one a male Popo, aged 45, gives the same history of the disease, commencing with severe pains. His left knee then began to swell, and the joint has become completely disorganised and has a flail-like movement.

The other, a female Popo aged 50, has a mass of ulcers over the right elbow, which is enlarged, and the bone of the arm is broken about two inches above the elbow joint. She informed me that it was not broken by violence but as a result of the disease.

On mentioning the disease to Sir William Macgregor, M.D., K.C.M.G., he told me he had seen one or two cases in Fiji, which gave the same history of

starting with rheumatic-like pains, and that the joints afterwards became swollen, but contained no fluid. He had never seen the disease attack the bones. Perhaps he had seen the disease in an earlier stage. None of my patients came to me until ulceration had well advanced.



A DISCUSSION ON MALARIA AND ITS PREVENTION.

I.—Notes on Antimalarial measures now being taken in Lagos.

By His Excellency Sir William MacGregor, K.C.M.G., M.D., Governor of Lagos.

THESE few field notes to be read at a discussion on Malaria have been written on the suggestion of Major Ronald Ross. The writer of them is deeply sensible of the honour conferred on him by being asked to prepare them—a request which has very willingly been complied with.

The general outline of the natural history of the malarial parasites is here accepted as sufficiently established for practical purposes by the unique and glorious labours of Major Ross. In these notes, therefore, only the practical aspects of the question are touched upon.

It may at once be premised that to no other country of the same size is the subject of malaria of greater importance than it is to Lagos. Its economic and industrial future very largely depends on whether malaria can be successfully combated or not. Lagos has been a malaria centre that has earned a very unenviable reputation. It is very favourably situated for commerce; geographically it is the natural port of outlet of the great interior province of Northern Nigeria. It seems clear enough that practically only two things are wanting to make Lagos a great and prosperous commercial town, by far the greatest in West Africa. These two things are the extension of the Lagos Railway to Northern Nigeria, and the control of malarial fever. The two undertakings are in practice closely connected together, and perhaps malaria is not the less important of the two. Both are practicable, but malaria is the more urgent, and therefore should be dealt with first. Malaria can also be coped with on a greater or lesser scale in proportion to the means available from time to time. Some of the steps now being taken in Lagos to combat malaria will be mentioned herein, more particularly from the point of view of the administrator.

It may be admitted at once that at Lagos, as probably everywhere else, the academic rules of procedure cannot in any one direction be carried out with scientific minuteness and detail. The measures adopted must be such as can be accomplished by the men and money at disposal; and as these co-efficients will very likely not be on the same scale in any two British colonies, the attack on malaria will doubtless be planned out differently according to local circumstances. Were there ample funds at disposal the

measures now taken in Lagos would be different from what they actually are at the present time.

It has been felt to be an important preliminary necessity that every effort should be made to acquaint with the general principles of the present malarial doctrine, not only the Europeans resident in this country, but also the natives of every degree of civilisation. For this purpose the reports of Professor Koch on his Eastern expedition, in which he demonstrates so effectively the specific action of quinine on malaria, have been translated and published in suitable pamphlet form, and have been widely distributed. The same course has been adopted with regard to Professor Celli's very convincing report on the use of mosquito netting on the Italian railways. Extracts have similarly been published and distributed from the reports of English expeditions and from other similar English works, including a paper on health, read by Dr. Strachan, Chief Medical Officer of Lagos, at Liverpool. A short course of popular lectures on malaria and dysentery has been delivered in Lagos by Dr. Best. These lectures, in which the use of technical terms and phraseology has been carefully avoided, have created a much larger amount of interest, and been far better attended, than one could have dared to hope for. It is contemplated that teachers in public schools, who have diligently attended Dr. Best's course, should impart to their scholars the rudiments of the malarial doctrine in a health class, which will be examined by an inspector in much the same way as any other school class, and will count equally with reading and writing for the distribution of the school grant. The Chief Medical Officer is now preparing a general course of lectures on sanitary subjects; and it is intended that these shall be repeated at different places, in the native language, by one or more of the medical officers that are natives of the country. It is certain that by these means, and by an intelligent appreciation of the vast importance of the subject to this country, a degree of interest in the question has been created in the public mind here that one could not have expected. It is very important that people should at the outset generally understand and believe the theory of malaria. Belief has become more general than one could have foreseen. It is gradually becoming understood.

In active operations the greatest attention is being given (1) to the prevention of malaria by the administration of quinine; and (2) to the use of gauze netting; while (3) at the same time the mosquito is attacked in

his breeding ground.

#### The Administration of Quinine.

It appears highly probable that at least as much can be done here by the use of quinine as a preventive

as by the employment of mosquito netting.

The greater number of Government officers take quinine regularly; but, of course, so long as taking quinine is not compulsory there will always be a residuum of men that, either because they cannot tolerate quinine, or for some other reason, will not use it as a preventive of fever. There are some half-a-dozen such in this service. This remedy is as much required for native as European officers. In 1900, 79 cases of fever in European officers, of an average

duration of 4.5 days, were treated by the medical officers, as against 149 cases of an average duration of 3.4 days among native officers. From January 1st to May 23rd the figures have been 15 European cases of an average duration of 7.5 days, against 47 native cases averaging 3.38 days. This gives a total

of 94 European cases and 196 native cases.

Recently no fresh case had occurred in Lagos for nearly a month. Then one case presented itself, and that one case occurred as opportunely for the malaria doctrine as if it had been made to order, for it was in the person of an officer on whom quinine produced its evil effects in an aggravated form, so that he could not take it as a preventive. As a symmetrical demonstration of the theory a second officer that shared the same quarters should have contracted the contagion from the first one, for the quarters were full of mosquitoes. But he took much quinine and escaped, thereby illustrating the already proved value of quinine as a preventive.

In all probability the day will come before long when newly-appointed officers for places like Lagos will have to undergo a test as to whether they can tolerate quinine or not. A man that cannot, or a man that will not, take quinine, should not be sent or remain in a malarial country, as he will be doing so at the risk

of his own life and to the danger of others.

The more common method here is to take daily doses of from 2½ to 5 grs., but several take a large dose weekly, and others irregularly. Each Government officer has been directed to obtain from the chief medical officer the quinine he requires for his tour of service. It is not improbable that it may eventually become a rule of the service that when an officer that has not been taking his quinine regularly gets fever, he will lose salary for the time he is laid up with it, unless he can show that he cannot tolerate quinine. So far as officers of the Government are concerned, it seems to be already tolerably certain that by the use of quinine, regularly taken as a prophylactic, they can be kept practically almost free of fever. We have had no serious case this year.

The great difficulty is how to extend this preventive treatment beyond the service, more particularly to the uneducated masses of the natives. It is simply impossible to protect the whole population by quinine administered as a prophylactic. In the first place, the great mass of natives would not take the medicine; and in the second place, the Government could not afford to pay for the seventy tons of quinine a year that would be required to give even a daily grain dose to each of 3,000,000 of people. Quinine as a preventive will not at present be given to natives outside of the town of Lagos. A special vote of £500 has been made for the purchase of this medicine for this particular purpose. A public dispensary already exists in the town, at some distance from the general hospital. At this dispensary between 2,000 and 3,000 patients are treated annually. A second dispensary is being constructed in Lagos, and a third one at the suburb of Ebute Metta. It was felt that this, and the appointment of a special medical officer to attend the poorer natives, would still fail to reach a large number of the indigent and more ignorant. To take up this work a large number of the educated ladies of Lagos have formed themselves into a league, chiefly for the purpose of administering quinine to native children and others suffering from or specially exposed to fever. These ladies are natives of West Africa, but many of them have been well educated in England. It is hoped that they may be able to induce many natives to take quinine that otherwise would simply refuse it. The league is at least an important educational institution.

# Mosquito Netting.

It is not likely that in a place like Lagos as good results can be obtained from the use of mosquito-proof netting as in Italy. One great objection to it here is the serious and highly disagreeable way it checks ventilation. This is a difficulty that cannot be fully brought home to one in a cold climate. But in a lowlying hot, and moist locality like Lagos, it comes to be a choice of evils to sit inside the netting stewed and suffocated, or to be worried and poisoned by mosquitoes outside. The netting is hardly a feasible remedy as regards native houses. It is not possible to protect even European quarters completely by it. Few officers or others are so occupied that they could spend the day in a mosquito-proof room. Certain it is that any man that suffers from the singular delusion that mosquitoes bite only during the night would have a speedy cure by spending a few days, or even a few hours, in Lagos. Operations here are being limited to supplying one mosquito-proof room to the quarters of each officer. In this he will be able to spend the evening free from mosquitoes if he chooses to do so. The European wards of the hospital are similarly protected. Hitherto we have used only muslin, as the wire netting ordered in England last November has only just now reached us. Much importance seems to be attached to the question of the material to be used in making the metallic netting, which alone can last in this climate. Muslin becomes full of mildew and rots in a few weeks when exposed.

We have had here a very useful experience as to the materials required for the metallic gauze. In May, 1894, some 250 yards of galvanised wire netting was obtained from England and was used in building rose houses at Government House in August of the same year. Those houses have been examined by the Assistant Director of Public Works, who says they will be good for four years more. This shows a vitality in this climate of some half score years for the galvanised wire netting. The experiment seems conclusive for Lagos, and in future this kind of gauze will be used instead of the expensive article made of compounds of copper.

## The Attack on Mosquitoes.

The measures taken for diminishing the number of mosquitoes are various. The most expensive is the slow, laborious, and costly one of filling in the swamps of Lagos. That is being done chiefly by convict labour, but will be much expedited soon by steam power. Meanwhile kerosene is being used on some of the swamp pools most favoured by the Anopheles. It is an unfortunate fact that the Anopheles is, at least in certain parts of Lagos, the most common mosquito.

About 70 per cent. of the many that haunt Government House are *Anopheles*, and unhappily they puncture one all day long.

Many of the water tanks about European quarters are found to contain large numbers of mosquito larvæ. A tinsmith has recently been engaged from England whose first duty it will be to make all water tanks mosquito-proof. It appears from many observations that mosquitoes do not breed in the Lagos wells, though they are seldom over twenty feet deep, while many are considerably shallower. Fortunately for Lagos the town is built on sand, through which rain pools soon disappear by filtration. But for that accident the place would be simply uninhabitable.

It is strongly recommended in certain competent quarters that to get away from infected mosquitoes Europeans should live at places apart from natives. This may be called the academic view. From the administrative point of view it is an unacceptable doctrine. The academic view is ungenerous, and would afford no radical remedy were it practicable, which it is not. The policy followed in Lagos in this as in other matters, is to take the native along with the European on the way leading to improvement. Here they cannot live apart nor work apart, and they should not try to do so. Separation would mean that little, or at least less, would be done for the native, and the admitted source of infection would remain perennial. To simply protect the European from fever here would never make Lagos the great commercial port that it should become. What we can do in this matter for the uneducated part of the Lagos population will be effected chiefly by reclaiming swamps and administering quinine.

It is a fact that has been impressed on myself in a marked manner during the last few weeks that mosquitoes are much more numerous about European quarters than about native dwellings. Up country there are not a few mosquitoes at every European quarter we put up, while at many native camps there were none. The reason of the difference seems to consist in the tanks and other receptacles for water, and in the greater frequency of pools about the quarters of Europeans, one of the results of greater cleanli-In the interior, speaking generally, the two places at which mosquitoes most abound are European quarters and the tops of the hills, the two localities at which one would reasonably expect them to be least numerous. The explanation with regard to the residences of Europeans has been given. In the granitic or gneissic hills there are numerous natural fissures, sometimes large numbers of artificial excavations that have served as mortars for grinding corn. In these fissures and excavations mosquitoes breed in large numbers. On the other hand, the low-lying country almost always consists of porous sandy soil through which rain is filtered into a subsoil of gravelly formation. A clay surface along which rain water runs is exceptional. The final result is that for six months in the year the propagation of mosquitoes is practically at a complete standstill in the The soil becomes extremely dry, and reinterior. mains in that condition for several months. One hardly ever sees a pool anywhere save in the beds of rivers and creeks of a considerable size. As these

latter are full of small fish the mosquito larvæ bred there have extremely little chance of survival. During the dry season there was not a mosquito to be seen at Oloke-Meji, on the Ogun River, a place that one would have expected to have been infested with them. It is the sandy porous soil of this country and its long-continued dry season that reduces the number of mosquitoes here to a very small fraction of those met with in a place like British New Guinea, for example. It would perhaps be possible to exterminate the mosquito altogether in the Lagos hinterland, if it were practicable to prevent their production near the coast, and their arrival from elsewhere. It is quite clear that the dry season here is a mighty factor against the mosquito and a most encouraging ally of his enemies. It was very noticeable at Lagos this year how the first shower of rain that fell brought at once on the scene a considerable number of mosquitoes where none were present before, just as if they had been unable to go abroad without something to revive them.

Doubtless it is in a great measure due to the long-continued absence of rain and to the nature of the soil that there is so little fever in many inland towns. The chiefs of some of them wish to make out that they have no fever at all. Others admit that they lose children by it. It is intended that the medical department should make a sufficient number of observations on children at those places to determine how far they are free from, or suffer from, fever. A European town would probably have much more on the sites of these native settlements on account of the freer use of water. The chiefs of these inland towns unanimously state that they have no "blackwater fever" there.

With the sanction of the Secretary of State the measures being taken to improve the sanitary condition of the town are being applied as far as practicable to the railway. "Borrow pits" near all stations are being filled up, or kerosene is used on them. The mosquito netting is to be employed there as in other quarters. Certain buildings have to be shifted. But there is nothing peculiar in this. In the dry season mosquitoes will all but disappear on the railway with reasonable attention to drainage.

In the matter of large trees, of which there are not a few in Lagos, a compromise has been adopted. It did not appear desirable to deprive the Lagos subsoil, which is made up of sand and mud, of the great pumping power that must be exercised by the many large-crowned trees now growing here. On the other hand, these trees did afford shelter to many mosquitoes. They have been thinned out, all undergrowth has been cut away, and all the lower branches that could be lopped off without disfiguring the tree have been removed to allow free passage to the sea breeze which generally blows at Lagos.

It is painfully apparent that what is being done at Lagos against malaria is far short of what is required, but it is a beginning, and if these measures are continued for even two or three years the effect will begin to be felt to such an extent as to encourage their continuance, let it be hoped, on a greater scale.

Malarial fever is not the only disease that creates a great mortality here. Large expenditure has to be

incurred with special reference to dysentery for instance. The total sum set apart for sanitary and health purposes in this colony during the current year is not under £34,500, or about one-seventh part of the whole revenue. More cannot be done without deranging other parts of the administrative machinery, which in turn would stop sanitation.

[After Sir William MacGregor's paper was read copies of lectures which had been delivered to the general public in Lagos were passed round. Two of these we have already published in the JOURNAL.—ED.]

II.—Note on the Habits of Europeans in India and Africa in Relation to Malaria.

By Major Ronald Ross, F.R.C.S., F.R.S.1

It can scarcely be disputed that the health of Europeans on the West Coast of Africa is in general much worse than in India. We can, however, suggest two explanations of the fact. Either the disease potential of West Africa is greater than the disease potential of India, or the mode of life of Europeans exposes them to infection more in the one country than in the other.

The first of these explanations—that Africa is actually more unhealthy than India—is the one which is generally accepted, but before admitting it we should inquire whether the excess of sickness in Africa may not possibly be largely due to the neglect of certain precautions which are more generally taken in India. In my experience the habits of Europeans are very different in the two countries. How far does this difference influence the sick list, especially from malaria?

There is probably only one really accurate method by which we can determine the degree of malaria in a given locality, and that is by ascertaining the average time in which a newcomer becomes infected. The shorter this period the greater, evidently, the malaria potential of the locality. Native children constitute the class of newcomers most accessible for making the estimate, and in order to compare the malaria potentials of Africa and India it would be necessary to carry out extensive blood examinations of the native children in both countries. Such examinations have been frequently made in Africa, but not, so far as I remember, in India. Hence, it seems to me we have no strict reasons at present for declaring that Africa is actually more malarious than India. It may prove to be the case that as many children are infected in India as in Africa; and certainly several informal observations of my own in various parts of India suggested that a large percentage of native children were infected in those parts (Secunderabad, Darjeeling, Terai, Nowgong District). If this surmise prove correct, we shall probably be compelled to attribute much of the malaria rate among Europeans in Africa to other causes than to a greater malarial potential. What these other causes may be I shall now endeavour to indicate.

I would first draw attention to the following remarkable facts about Indian malaria. In Calcutta autoc-



<sup>&</sup>lt;sup>1</sup> Taken as read in the unavoidable absence of the President.

thonous malarial infection is scarcely known to occur (it is, at least, far from common) among the thousands of European citizens, who would indeed be very surprised to learn that Calcutta is a malarious city. But as a matter of fact malaria does exist, and to a very considerable degree, among the native population. The same thing occurs, according to my experience, in Madras, Bangalore, Bombay, and probably in many other stations. In Madras, Maitland has noted an analogous fact—that while filariasis is very common among natives, it is very rare among Europeans.

On the other hand, as soon as we leave the large Indian stations, and travel into the districts, we find malaria to be much more rife among Europeans. Officials on district work, sportsmen, and troops on service frequently become infected. In certain large areas occupied by planters, such as the Nilgiri, Assamese, and Terai plantations, malaria is just as common, or even more common, among Europeans than among natives. In fact, to judge from my own observations, the conditions as regards malaria of the Europeans in these Indian plantations approximates closely to the West African conditions.

To what cause are we to attribute the comparative indemnity of Europeans in the larger Indian stations? It can scarcely be due to a smaller malaria potential, because the natives in these stations often suffer with great severity.

In considering this question I have been much struck of late by the fact that, as already mentioned, the habits of Europeans in the Indian stations differ in several important particulars from their habits in Indian plantations and in Africa. I refer especially to the habitual use of punkahs, mosquito nets, well-built houses, and comparatively good food in the Indian stations. On the other hand, these comforts are often or generally wanting in the Indian plantations and the African coast towns; and it is just where they are wanting that the Europeans suffer most sickness.

Let us compare, for example, the habits of a European in a business house in Calcutta with the habits of a European in West Africa. In Calcutta he sleeps under a punkah or mosquito-net, or both; he dresses and breakfasts under a punkah; he works all day at his office under a punkah; in the evening he takes vigorous exercise, and he dines under a punkah. He wears the lightest possible clothing; he lives in a solid, cool, airy house, and he obtains very good food. Once in five or six years he returns to Europe for leave. The result is that he leads a comparatively healthy, vigorous, and comfortable existence. Many men in Calcutta have informed me that they seldom feel unduly warm, and the constant use of the punkah certainly has the effect of cooling the skin and keeping off mosquitoes and other obnoxious flies. The houses, being built in the European quarter and surrounded by a considerable "compound," are usually well segregated from the native neighbourhood, and the good food and exercise preserve the general health of the majority of European settlers.

In Africa the houses are frequently very bad. In Freetown, for instance, they are the same as the houses of natives, and are mingled with these, being often nothing but a kind of wooden shanty, without

sufficient verandahs and gardens, and frequently built over native shops in a manner which fills a European coming from India with astonishment. The Anglo-African seems to imagine that he can live in the tropics in the same manner as he lives in England. He seldom uses a punkah, except, perhaps, for an hour at dinner time, and not seldom he neglects even the mosquito net. The food is often or generally execrable—fresh milk, butter, and vegetables not being procurable. Tea can seldom be obtained, and aerated waters cost sixpence a bottle. Owing to the frequent absence of gymkanas and clubs, the exile obtains little suitable exercise: and the country being too "unhealthy" for ladies, sociable recreations are few. A similar state of things often prevails in the planting districts in India.

The result is that the European often leads in these countries a most doleful existence. Bathed day and night in perspiration, constantly bitten by mosquitoes, without healthful exercise, cheerful society, good food, or even such comforts as ice, he is not only always open to malarial infection, but soon undergoes a marked general deterioration of his body due to the incessant heat and discomforts in which he lives. His one desire becomes, not to render his present life more agreeable, but to escape from it on leave to England as soon as possible—a state of things which does more than anything else to ruin the business and progress of the country.

I cannot record too strongly my own conviction, based upon experiences formed both in India and Africa, that the "unhealthiness" of the latter country is really chiefly due to the causes I have just referred to. Most especially I think it is due to the neglect of the punkah, even more, perhaps, than to the neglect of the mosquito net. It becomes more and more evident to me that the use of the punkah, or at least the electric fan, is indispensable to Europeans in the tropics, not only for keeping off mosquitoes, but for preserving the general vigour of the body.

Scarcely less important are the dairy, the vegetable farm, the ice machine, and the soda-water machine. All these comforts, foolishly called luxuries, are in reality absolute necessities for healthy life in the tropics. The European quarter, the well-constructed house, and the large open "compound," are no less important. The slow progress of the African colonies is chiefly due to the stupid indifference to these details; while the great fabric of our Indian Empire is really based upon the wise habits of life which render existence tolerable for the men who have constructed it.

# III.—THE PREVENTION OF MALARIA IN HONG KONG. By J. M. Young, M.B., F.R.C.S.Ed.

The prevalence of malaria in the island of Hong Kong has not only been demonstrated by finding the various types (both benign and malignant) of the malarial parasite in the blood of patients, but also by whole districts mapped out as notoriously unhealthy, houses after being built standing uninhabited, whole terraces unletable, and having to be pulled down, because of the amount of fever from which the

inhabitants suffered. For six months under the military and civil authorities I made extensive experiments over considerable areas, with the object of finding out the cause and making suggestions as to

the prevention of malaria.

Afike from adult mosquitoes secured and examined, and from larvæ collected from various breeding pools and developed in captivity two distinct varieties of Anopheles are abundant — Anopheles costalis and Anopheles sinensis, and nearly a dozen distinct species of Culex, the proportion of Anopheles varying in different localities as shown in the following table made out by Mr. J. C. Thomson, M.D., M.A., taken from the Governor's Gazette, January 11th, 1901:—

		itos	ANOPE	IELES	Culex		
			Mosquitos examined	Number	Per cent.	Number	Per cent.
No. 1 Station			260	6	2.3	254	97.7
Pokfulam			39	13	33.3	26	66.7
Aberdeen	1.4		101	1	1.0	100	99.0
Stanley			147	3	2.0	144	98.0
Shek O			125	70	56.0	55	44.0
Tai-po			216	111	51.4	105	48.6
Sha Teu Kok			141	54	28.3	87	61.7
Sheung Shui			76	1	1.3	75	98.7
San Tin			8	1	12.5	7	87.5
Tai O			68	20	29.4	48	70.6
Tung Chung			55	11	20.0	44	80.0
Choung Chau			575	1	0.2	574	99.8
Lamma			32	2	6.2	30	93.8

The localisation of the various Anopheles' breeding pools around twenty selected districts where malaria had distinctly and repeatedly manifested itself, gives some important information as to the range of an infected area from a given nidus. From these I have chosen six, of which I give full details and measured distances, with rough sketch maps.

# (1) The Military Sanatorium.

An isolated building, with accommodation for two companies and officers' quarters, situated on the hill-side above Hong Kong City. The history of this building is most instructive. Three years ago, owing to the prevalence of malarial fever of a most malignant type (80 per cent. of the last company sent there being down with malaria) the building had to be closed. This valuable property had assumed a most deserted appearance, the trees, shrubs, and grass having

grown up all over the hillside.

After carefully examining the various streams around, the haunts and breeding places of Anopheles were very distinctly localised; many adult Anopheles were captured, and the discovery of dozens of their breeding pools within a few hundred yards of the sanatorium made me safe in pointing out the cause of the notorious name which this building had acquired, and in suggesting the remedy, by destroying them in the bush and preventing others from breeding in the pools and bogs around. In the immediate vicinity of this building numerous bogs of mud and rank grass, with an aggregate area of not less than half an acre, exist; these bogs lie hidden in the hollows of the hills, and nothing could be more like African fever swamp. These forming with the luxuriant vegetation

around the best nidus for the development and subsequent life-history of mosquitoes. (Within eighty yards of the main building with an ordinary teaspoon I scooped up four *Anopheles* larvæ at one time.)

The officer commanding (General Gascoigne) having given me full liberty and granted 150 Indian troops of the Hyderabad contingent, we began by clearing the hillside, working out from the main building, cutting and burning absolutely the undergrowth and tangled creepers—this for a distance of 300 yards occupied the men for a period of two months. The bogs and pools were then drained by ordinary surface draining, and for a period of at least two years this area is to be kept rigorously free from the dense impenetrable undergrowth. The health of the troops has remained good during the whole time, and the building is now inhabited by white soldiers.

## (2) Lyemoon Barracks.

A modern building situated 200 feet above the sea, on the hill commanding the Northern Pass to Hong Kong Harbour. The persistent outbreaks of fever and the almost continuous stream of patients sent to hospital from this building rendered the question an extremely important one to the military authorities.

On the north side, nestling in the hollow of the hills, I found numerous pools and small bogs in which were hundreds of larvæ of *Anopheles*, especially in and around the rice fields cultivated by the Chinese, in

one case within eighty yards of the barracks.

On the west side, 180 yards from this building, is the police station and Chinese village of Sakiwan, which have been free from malaria. Mosquitoes have been regularly collected by the police, no Anopheles have been caught, and no "fevers" are reported among the native police or in the village of 1,500 population. Thus the distribution of Anopheles conforms accurately to the history of the outbreak of malaria, as, after exhaustive search, I was unable to find one breeding pool with Anopheles larvæ round Sakiwan.

## (3) Men's Married Quarters, Kennedy Road.

A magnificent new building, only opened a year ago in July. The rooms airy and all modern conveniences, little or no malaria in the district. Unfortunately the builders left rubbish and pools lying around the house. In one of these artificial ponds were hundreds of larvæ of Anopheles within fifty yards of this building. There were no Anopheles in the surrounding streams when I examined them in August. After a time these pools were filled up and drained, but before that hundreds of adult Anopheles must have developed and were then living in the bush; they were secured in and around the building. Note what occurred. When the Anopheles were driven from their breeding pools they took the next best pools, and I found them in December in the streams around, in pools which I had examined three months before with a negative result. Then gradually the children began to have feverish attacks, and the inhabitants of the houses around complained, the Military Women's Hospital became crowded with patients, until within six months of the opening of this building out of 73 women and children 33 per cent. had fever, of the

children under 10 years 50 per cent., and unfortunately there were three deaths to record; and in a few selected cases among the children the blood under microscopic examination contained parasites.

## (4) Pokfulam.

The French Fathers sixteen years ago bought property for schools and training colleges, which four years later, owing to almost continuous attacks of fever and the sad loss of life therefrom, they had to relinquish at considerable loss and remove to another site about a half a mile from the old place; again, in another building occupied by Madame Musso, 300 yards further west, fever has been common. In the present building occupied by the Fathers and 150 children they have had little or no malaria; and on the most careful examination I was unable to discover one larva of Anopheles, while in and around the old site and around the house occupied by Madame Musso, I found them breeding in hundreds. As this is the history extending over years, and as the facts conform accurately to the prevalence of *Anopheles* and malaria, it would afford strong presumptive evidence of the distance travelled by mosquitoes over an infected area.

# (5) Mount Richmond.

One of the finest private residences in the Colony, originally costing 130,000 dols., was sold for something like 25,000 dols. At the request of the owner I examined this district, and from the report sent to him

I read the following :-

"The history you gave me of the various buildings and the prevalence of malaria was most instructive, and from it alone I felt sure that there must be some breeding pools in the immediate vicinity, but I hardly expected to find them so close to the building and so localised. I have to-day taken nearly a hundred larvæ of Anopheles from a single pool within eighty yards of your house. I have no hesitation in saying that you could not be without fever, and that this fully explains why for years the district has had a fever-stricken name.

Why is it that within fifty yards of this property, separated by a road and a clear space, other houses were free from malaria, and the inhabitants lived for years in comparative immunity? The cause and effect are so distinctly marked out that I was fully justified in promising the owner a permanent and effective cure which would greatly enhance the value of his property at a comparatively small cost.

#### (6) Tai-po Police Station.

The following extracts from a report, dated Hong Kong, November 17th, 1900, by Drs. J. M. Young and John C. Thomson, gives the results of an inquiry into the causation of the prevalence of malarial fever at

Tai-po:—
We have the honour to report, for the information of His Excellency the Governor, that in accordance with His Excellency's instructions we proceed to Tai-po for the purpose of inquiring into the causation of the marked prevalence of malarial fever there recently.

We already had before us the following statistics as to the prevalence of mosquitoes at Tai-po during the preceding months:-

Date.				Mosquitoes Caught.	Anophel	es.	Culex.
September	4th			50	 1		49
,,	19th			11	 4		7
"	24th			62	 23		39
October	4th			50	 5		45
,,	17th			37	 33		4
,,	21st			44	 27		17
November	12th			55	 33		22
					-		_
	Total			309	126		183
		That is	. And	pheles	 40 1	per ce	ent.
		,,	Cul		 60	per ce	ent.

So that during the period between September 4th and the date of our visit, 40 per cent. may be taken as the actual average prevalence of the Anopheles sinensis among all mosquitoes found.

From police records placed at our disposal, we ascertained that the cases of fever among the police during the last twelve months have been as follows:-

		Nur	nber of	Cases.	Average Polic	e St	trength.
Half November,	1899		5		2 Europeans,	7	Indians.
December	,,		2		,,		,,
January,	1900		1		,,		,,
February,	,,		2		,,,		,,
March	,,		2		,,		,,
April	,,		0		"		,,
May	,,		2		,,		**
June	,,		5		,,		,,
July	,,		13		3 Europeans,	22	Indians.
August	,,		27		,,		,,
September	,,		28		,,		**
October	,,		17		**		,,
Half November	,,	••	1		,,	14	,,

We made careful search in all directions around the Government buildings and matsheds for breeding places of Anopheles. From the results of our search, we direct attention to two important points: (1) that the breeding pools that proved most important, and which even at this late date in the year contain abundant larvæ, are within 80 yards of the police station, and 40 yards from the matshed occupied by the civil staff; and (2) that the marshy stream above referred to is a permanent and prolific breeding ground.

We examined under the microscope the blood of ten children from the village nearest to the police station.

Sex.		Age.		Tuna	of Paras	site Found.
DOA.		Age.				
М.	 	3	 	Benign	tertia	n gamete.
$\mathbf{F}$ .	 	8	 	"	,,	rosette.
M.	 	14	 	Nil.		
$\mathbf{M}$ .	 	9	 	Nil.		
M.	 	3	 	Æstivo	-autur	nnal gamete.
M.	 	15	 	Nil.		
F.	 	5	 	Young	æstivo	-autumnal.
M.	 	14	 	,,	,,	11
M.	 	9	 	Nil.		
M.	 	8	 	Nil.		

Thus in 50 per cent. of the cases examined we found the parasites of malaria; 2 cases were of benign type and 3 malignant, and while all five children were infective to the mosquito, rendering any Anopheles

feeding upon them capable of a few days later transmitting the disease to other persons, in 2 cases the form of the parasite that actually came under our observation was the gamete, namely, the form which when ingested by the mosquito is capable of undergoing metamorphosis in the body of that insect.

In the abundance of mosquitoes of the Anopheles genus above described, with their breeding-grounds almost close up to the Government buildings, and in the near proximity of an extensively-infected native population, by which many of these mosquitoes are being continuously rendered infective to healthy persons who may be bitten by them, we have the factors that account sufficiently and conclusively for the fevers that have prevailed among the Government

officers at Tai-po.

We are of opinion that the seasonal increase of fever cases that has been observed at the time of ploughing, and at the period of harvesting the two rice crops, is due to the disturbance at these times of mosquitoes usually resting among the grass or growing paddy, and feeding on Chinese coming within their reach, such disturbance resulting in their flying further afield and finding their way in larger numbers to the houses on the hills.

I would emphasise the practical impossibility of dealing with the larvæ of mosquitoes by any germicide on account of the hidden nature of many of their breeding places, which were only found after the undergrowth was removed; and on account of the luxurious vegetation in which the adult mosquitoes Culicides, petroleum gas, lime, gallol, &c., are only subsidiary measures, although undoubtedly

useful.

The only permanent and effectual method seems to be that adopted in Hong Kong: (1) Clearing all long grass and undergrowth, and then (2) destroying all breeding places by draining, &c. Alike from observation and experiment, I would place a cleared area as of immense importance; no mosquitoes will fly far without vegetation, and old residents in West Africa have by experience found this out, and regularly burn the bush, and this is over and over again emphasised in various localities in Hong Kong; even a road intervening made all the difference to the health of a

community.

Extensive experiments have been made as to the destruction of mosquitoes and their larvæ by the "natural enemies of mosquitoes," dragon flies, tadpoles, small fish; the whole subject seems to me of little practical importance. I have repeatedly put 20 Culex larvæ and 20 Anopheles, collected from different pools, together. The effect was astonish-Within twenty-four hours there was no trace of the Anopheles larvæ, and like Pharaoh's lean kine the Culex did not seem any the fatter for having absorbed them; indeed, no one can realise the intensity of the struggle for existence which goes on in a stagnant pool until he forces himself with a large hand lens to watch the various forms of life with which the water is swarming. Culex larvæ, then, are an important factor explaining why in many places where mosquitoes are more numerous there is no malaria, the weaker Anopheles being overcome in the struggle for existence.

#### Conclusions.

These results, and the details of other places, led me to the following conclusions:-

(1) That malaria, in every place examined, was invariably associated with Anopheles' breeding pools in

the immediate vicinity.

- (2) That in no case were Anopheles found in the neighbourhood of houses without malarial fever manifesting itself repeatedly, that is, where Anopheles are found, there is fever, and in every district where there is marked malaria there, the blood of children examined contained the malarial parasite, living Anopheles were caught and their breeding pools localised.
- (3) That in no case was there a greater distance from the breeding pools to the houses infected than 150 yards.

(4) That the breeding pools were always localised and comparatively easily treated by surface draining.

(5) That the only practical steps found effectual were by clearing the district of all shrubs, grass, bamboos, &c., to driving the adult female mosquitoes and then draining their breeding pools; this combination is absolutely essential, to treat the pools with any larvicide alone means that they scatter and select other pools to lay their larvæ and breed from.

In conclusion, these results corroborate recent investigation made by others, and I believe if properly carried out, even over a limited area, would free that district from the haunts of Anopheles, and consequently the horrors of malarial fever. It is no Utopian idea to think that within a few years an island like Hong Kong or Stretton Island, New York, may be cleared by our breaking the extra-corporeal life circle of the malaria parasite. Within the last year I have visited Sierra Leone and seen Major Ross at work, have seen the experiments at Stretton Island, New York, under Dr. Howard, U.S. Entomologist, and I unhesitatingly state that in none of these places would I be more hopeful of the prevention of malaria than in Hong Kong.

(To be continued.)

QUININE ADMINISTRATION IN INDIA .- The Sanitary Commissioner's report shows that some progress is being made in the N.-W.P. and Oudh towards Professor Koch's ideal, the quinineising of the popu-A scheme for the sale of quinine through landlords and their agents was introduced in the districts of the Allahabad, Rohilkhand, Lucknow, and Fyzabad Divisions; but as a beginning was made only in October last, it is too early to predict whether the non-official agency will prove successful. Government of Madras have recently offered to reduce the price paid for quinine in bulk, and we are told that it will be possible, when the arrangements have been completed, to reduce the sale price of quinine packets by one-third. An increased sale of the drug may then be expected.

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THE

# Journal of Tropical Medicine

Остовек 15, 1901.

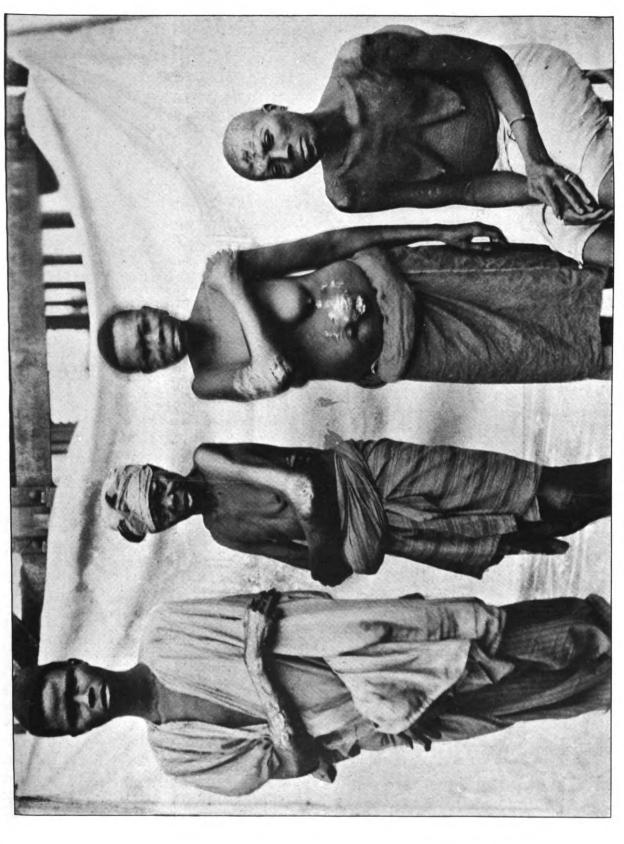
# PRIVATE PRACTITIONERS IN THE TROPICS AND EDUCATION IN TROPICAL DISEASES.

LATELY it has happened that we have come in contact with a number of young medical men proceeding to the tropics to join medical men in practice there as partners or as assistants. In no case had any of them had an education in tropical diseases, and the invariable answer was "I should like to go to the School of Tropical Medicine but I have no time, I sail in a week or two." It is evidently not the fault of the young men themselves, they are all anxious to know something of the work they are about to take up, but it is the period of their departure that hampers them. This will all no doubt in future be changed, and it ought to be changed now.

It is fair to no one at the present day that a medical man should proceed to the tropics without a knowledge of tropical disease. In the first place it is not fair that he should be placed in charge of persons suffering from diseases, which, in some instances, he may not have even heard the name of. The public have a right to expect that the medical man left in absolute charge of a community shall at least have been properly educated, but instead it often happens that the resident practitioner leaves the new comer in charge within a few days of his arrival, and goes home for a year or so, or at least takes a holiday for a few weeks.

If during his absence critical cases arise, the public are justified in grumbling if they are left in the hands of a young, imperfectly-trained doctor; or if there is a rival practitioner in the place the doctor on holiday will find a sadly diminished practice when he returns. It is therefore bad for the doctor's practice and unjust to the public that any man, now the opportunity is afforded him, should (be allowed to) proceed to a warm climate to take up practice imperfectly trained.

It ought to be a stipulation, in fact it will be the most important condition in the contract of engagements in the future, that any assistant, locum tenens, salaried partner, or partner, going out to engage in practice in a warm climate, must be trained and certified in tropical diseases before leaving the British shores. If the doctors do not see the necessity and expediency of this condition their patients soon will, and it is probable that after Sir Francis Lovell's journey the first words that will greet a new-comer will be "Have you been through a course at the London School of Tropical Medicine?" The subject of training in tropical diseases will have been brought keenly home to them by Sir Francis's visit; many will have given money to support the institution, and they may fairly expect in turn that their own medical man should be possessed of the advantages this school affords. For the sake of the public and for the sake of the resident practitioner, it is expedient that the advantages offered by a training in tropical medicine be insisted on before going abroad. In



PHOTOGRAPHS OF PATIENTS SUFFERING FROM

# CHAPPA.

A Disease met with in Lagos, and described in this issue of the Journal by Epward H. Read, M.R.C.S., L.R.C.P.

Bale and Danielsson, Ltd., London.



time, in no long time we believe, medical men taking berths as doctors on board ships sailing to warm climates, will be required to show a certificate of education in tropical ailments; and we would urge the shipping companies, in the interests of their passengers and in the interests of their crews, to at least give preference to men trained in tropical diseases, when selecting candidates as medical officers for their ships. In a few years it will not be a question of option or of preference but one of law that the medical officer, to any ship bound for tropical seas, shall possess the necessary qualification for the work in hand before the vessel is allowed to clear. On British vessels more particularly tropical residents, old and young, are constantly passing to and fro under the charge of men to whom malaria is an unfamiliar disease; who have never heard of sprue; to whom dysentery is known from a general textbook merely; or to whom even Dhobhie itch conveys no meaning.

Apart from every other consideration also, the position of a young doctor, about to take up practice in a warm climate, is quite different if he has had even a short training in the work he must undertake. Without such education he is in doubt and trouble as to the correctness of his diagnosis and treatment for at least a year after taking up practice. In such a frame of mind his work can be no pleasure to him, and, instead of laying up knowledge which adds to the stock of his experience and to his own value, he gets through his work with a self-accusing consciousness that he is not properly equipped for his duties. No more galling or humiliating position can be imagined, and all the more keenly does it come home to him when he knows that it is by his own neglect that he is so situated. If trained in the elements of his profession as regards tropical medicine, he rejoices to meet with, and to be able to diagnose, new ailments; and, as his experience is built upon a sure foundation, he not only becomes early in his career a more valuable practitioner, but whilst young and fresh and vigorous is more likely to take a scientific interest in his work, without which practice in a warm climate is mere drudgery.

# Article for Discussion.

# THE DANGER OF SUBCUTANEOUS INJECTION OF QUININE.

REMARKS BY

I.—Osborne Browne, M.B.
Assistant Colonial Surgeon, Gold Coast.

In your issue of October 1st under "Article for Discussion," "The Danger of Subcutaneous Injection of Quinine," I should like to state my experience of one case as far as I can from a rather vivid memory of it.

When practising in British Honduras a child was brought to me suffering badly from malaria. I decided to give the hypodermic method of quinine a trial, and made a solution of quinine sulphate with the aid of heat and just enough acid sulphuric dil. to effect its solution; for the purpose of this solution I injected the desired quantity—certainly not more than about 10 minims. The syringe was boiled, as was also the solution, and the skin washed with antiseptic lotion, so that there was no chance of infection with any living organism.

There was considerable pain after injection and the skin at the site became erythematous.

About a week afterwards the child was brought round by its rather indignant relative.

The fever has never recurred, but on the site of injection on the forearm was a sharply defined, deep and absolutely circular ulcer about the size of a florin or half crown, which took a long time to heal. I have since then injected as much as 20 grains of quinine bihydrochloride (compressed into one ounce cakes by Howard) into the gluteus maximus without the slightest ill result.

I believe that the acid used to effect solution is the cause of the necrosis, and would warn men injecting very insoluble salts which they dissolve themselves with acid.

II.—DAVID ALEXANDER, L.R.C.P., L.R.C.S. (Late) Colonial Medical Service, Jamaica.

With reference to Dr. Townsend's letter on the "Danger of Subcutaneous Injection of Quinine," and your remarks thereon in your last issue, I venture to give my experience. My first trial

was in 1897, when I gave in an otherwise healthy patient two injections, one in the upper forearm, the other in the calf of the leg, using the following formula based on that in Burney Yeo's "Therapeutics":—

 Ry Quin. hydrochlorat.
 ...
 ...
 gr. xv.

 Acid. hydrochlor. dil.
 ...
 ...
 m. v.

 Aq....
 ...
 ...
 ...
 m. xxv.

Over the sites of both injections troublesome abscesses formed, although I had been very particular with the syringe and the skin. The bad result here, I daresay, was due to the fact that the injections were not given deep enough. had no occasion to make a further trial until the beginning of last year, when I used Benson's method as recommended in Dr. Manson's work. This I injected into the buttock, but with the same result. After this I tried solutions of quinine in hydrobromic acid and tartaric acid, with the same unhappy result. Since then up to the beginning of this year I have given eight or nine injections with good results, my procedure being as follows. I bought a new syringe which I kept for quinine injections only; before and after using each time I cleansed the needle and syringe carefully with carbolic lotion 1 in 20. In a test tube I boiled a sufficiency of water, and to this added the bisulphate of quinine, which is very readily soluble. The site was well washed with soap and water, then rubbed with spirits of turpentine, and finally with the 1 in 20 solution, and the injection given deep into the muscles of the buttock. The only untoward effects were a little pain and stiffness of the leg, but this only lasted for a day.

# Translations.

# THE TREATMENT OF CHYLURIA BY ICHTHYOL.

By Dr. Moncorvo, jun., Rio de Janeiro. (Translated from the French by P. Falcke.)

Until quite recently the treatment of chyluria, a disease that occurs frequently in the tropics, was limited to the use of empiric methods, or to symptomatic means of relief. For this purpose practitioners successively tried iron, astringents, arsenic, quinine, manganese, decoctions from the most diverse

plants, and hydropathic treatment; finally, as a last resource, the patient was advised to return to Europe, a step which up to the present is with justice considered to be the most potent factor in curing this complaint.

Lately, some doctors, influenced by the etiological history of the disease, were led to try parasiticidal drugs. The most various sequelæ have resulted from the use of terebenethinæ (Guyon), koussu, naphthol (Pacifico Pereira), and thymol (Lawrie).

Influenced by similar ideas, I was in 1896 induced to try methylene blue and asaprol (daily dose 4 to 6 grammes) in the case of a young man who was suffering from chyluria and whose general condition of health gave cause for uneasiness. These drugs, however, employed for the first time in a case of this nature, did not give satisfaction, for though they caused relief to a certain degree, definite recovery was only attained in consequence of a prolonged stay on the mountains in a cold district of the States of Minas Geraes.

Wishing to continue my therapeutical researches in this field, I recently resolved in analogous cases to study the action of a medicament, the germicidal and ischuretic properties of which had given excellent results in the treatment of lymphangitis, &c. The drug in question is *ichthyol*, and it was not long before I was able to prove its efficacy in two cases of chyluria, the favourable issue of which has led me to publish my experience.

Case I.—Male, aged 21, a white, a Brazilian merchant, who sought my advice on March 2nd, 1897, for hæmatochyluria, from which complaint he had been suffering for the last four months, and which threatened to undermine his constitution. The malady, moreover, had been recently aggravated by the coincidence of blenorrhagia. Arsenic, terpinal, benzo-naphthol and asaprol were successively administered without producing the slightest improvement. On March 16th, I therefore began the ichthyol treatment in daily doses of ½ gramme in the form of pills. This dose was increased two days after to 1 gramme, and later to 11 grammes per diem. After this treatment the urine became less and less sanguinolent, and in short, ten days later, it did not exhibit the slightest deviation from the normal. I should mention that on microscopically examining the clots before commencing the treatment, a large number of filarial embryos without movement were exhibited. As the urine regained its normal colour, so the blood and the chylous clots diminished proportionately. The local manifestations of the disease decreased, the patient's general condition improved, and his appetite returned. The drug was always well borne. At the end of six months no urinary trouble of any kind could be determined. At the present time my former patient is in excellent health.

Case II.—Female half-caste, Brazilian, aged 25, married. Has suffered for over a year from marked and persistent chyluria. She consulted me on August 17th, 1897, on which occasion I examined the urine and confirmed the presence of blood and chylous clots which contained a number of filaria (Wucherer) which established the correct diagnosis.

The woman had tried several treatments and was

very discouraged at their uselessness. I immediately put her on ichthyol in pills, first in daily doses of 1 gramme, later on daily doses of 2 grammes. The drug was borne well, and improvement soon commenced to take place. At the end of twelve days all local and general symptoms had disappeared, and the urine had become of normal constituency.

The favourable and speedy results obtained in this case by the exclusive use of ichthyol have been maintained up to the present time. The woman regained her vigour, had an excellent appetite, and did not

have any further urinary troubles.

These two cases of quick recovery from an intractable and parasitical disease seem to indicate ichthyol as a valuable therepeutical agent in the treatment of chyluria, which hitherto has proved rebellious to any means excepting change of climate.

A new path, therefore, seems to be opened to those doctors who have analogous cases to combat.—(Bulletine général de Therapeutique, December 8th, 1897.)

# UGANDA PROTECTORATE—REPORT FOR THE YEAR ENDING DECEMBER 31, 1900.

By Dr. R. U. MOFFAT, C.M.G. Principal Medical Officer.

#### SURGICAL DISEASES.

THE native constitution possesses a capacity for repair after wounds which is nothing short of

Injuries which, in a European subject, would unhesitatingly be pronounced as hopeless, or as necessitating amputation, will heal up in a native in a manner most embarrassing to the surgeon, who bases his prognosis on his previous surgical experience among civilised people.

Septicæmia and pyæmia are almost unknown; tetanus is extremely rare. Only one case has come under my observation during the whole time I have been in East Africa, and in this case there was no

wound to account for it.

True phlegmonous erysipelas is also, I think, unknown, and anthrax and glanders I have never met with.

For all these reasons there should be a grand field for surgical work among the natives of this country.

As a matter of fact, very little has been done in this direction by Government medical officers, owing, no doubt, in a great measure, to the unfavourable conditions in which most of them are placed, having no skilled assistance and no means for enforcing proper care and attention in the after treatment. reason, it would appear that very few medical officers undertake much surgical work, except in those cases in which it is absolutely necessary in order to save life.

I will just shortly indicate the commonest surgical affections which come under our notice.

Localised, more or less superficial, inflammations and suppurations are very common, such as whitlows, buboes and abscesses. Ulcers of all kinds account for probably 50 per cent. of our cases of a surgical nature.

The skin of the black man appears to be particularly prone to ulceration, and one sees in this country a sloughing form of ulceration such as I have myself never met with elsewhere.

The best treatment for these is to rub the sloughing surface energetically with pure carbolic, and then to apply a wet dressing of lint, covered with gutta-percha. This should be changed every few hours. The applications of carbolic generally need to be repeated for five or six days. For ulcers of all kinds, nothing I find answers so well as the wet dressing.

Diseases due to parasites, specific organism, &c. Tubercular disease of a surgical nature I have never

met.

The chiggoe (or sand flea) still flourishes throughout the Protectorate, but its ravages are now not serious. It was introduced into Uganda from the west in the beginning of 1893. Curiously enough, Stanley's Emin Relief Expedition was credited with the onus of responsibility for having brought it through from the West Coast. Whether this was so or not I cannot say, but it is no doubt indirectly true, for since that time there has been increased inter-tribal communication, and this would, of course, lead to the spread of this pest. For the first two years after reaching Uganda its ravages were so terrible that it assumed the dimensions of a veritable plague. Many hundreds of people lost one or more toes, and I should think half the population were temporarily incapacitated for longer or shorter periods.

It would appear that when first introduced into a country its effects are much more virulent than they subsequently become. Though still extant in the Uganda Protectorate, the chiggoe does not now give

The guinea worm abounds in the Nile Valley below the Albert Lake, but does not occur in Unyoro or Uganda, except in people who have lately come from the infected district.

Filaria Sanguinis.—None of the filariæ exist, to my knowledge, in the Uganda Protectorate. On the coast the Filaria Nocturna is common, and one not unfrequently finds it in Swahilis and other people temporarily residing in the Uganda Protectorate.

Bilharzia.-I have had two cases of this disease during the year. Both were Swahilis, and it is impossible to say where they contracted it. It is found on the coast, and I am inclined to think it does exist also in Uganda. Very many cases of unexplainable bladder hæmorrhage have at times come under my notice on occasions when I was unable to examine the

urine microscopically.

Mycetoma and actinomycosis I have not seen, though there is a disease which bears a certain resemblance to the former. The Swahilis call it (pronounced "emte"). It consists of a brawny thickening of the affected limb, usually the leg. At certain points a sort of slow suppuration occurs. The skin eventually ulcerates, and a thick pus is discharged, after which an irregular sinus persists; often these burrow and communicate with each other. The disease is very chronic, and seems to go on for years.

I have found energetic local treatment does sometimes effect a certain amount of cure. I generally slit up the sinuses, and, if necessary, scrape their

walls. Then scrub them freely with pure carbolic, after which stuff with iodoform gauze. I have seen great improvement follow after such treatment, but it is very apt to recur. Prolonged rest in bed, if it were possible to enforce it, might assist.

Snakes .- Although there are many snakes through-

out the country, we seldom hear of fatalities.

One fatal case occurred in Kampala this year, but it was not reported to me till the man was dead. He

had been bitten twelve hours previously.

I have had five other cases during the year, all of which recovered. In no case was the snake killed, and it is possible that they were not of a very venomous nature. In two cases there was a certain amount of after swelling and pain. The treatment I adopt is to incise the point of puncture and to rub in some crystals of pure pot. permang. I also inject a solution, 1 per cent., round the wound, especially on the proximal side. This treatment is, of course, useless unless the patient is seen very shortly after the bite.

Venereal Disease.—Is excessively common both among Europeans and natives. It appears to be rampant among the Waganda, but I am not aware whether other aboriginal natives are much affected. If not, it will soon spread among them with the advance of civilisation, for every Government station unfortunately acts as a disseminating centre, owing to the fact that the coast natives employed are almost all more or less affected.

Gonorrhœa is especially common. In itself it appears to give very little trouble to the native, but in a very large percentage of cases epididymitis and orchitis result. This is no doubt due to their carelessness; in many cases they only seek treatment when

some such complication has supervened.

It is a curious fact that though gonorrhea is so very common stricture of the urethra is exceedingly rare. I am inclined to attribute this to the size of the parts. In regard to treatment I can recommend the practice of irrigation. The actual solution used is of no great importance. I generally use boric acid or zinc sulphate, and the urethra is washed out morning and evening with a pint of solution. This is much more effective and reliable than the syringe, the working of which it is difficult to explain to a native. I am now using specially made tubes, perforated near the tip, which is bulbous. When this is not available an ordinary small size catheter serves almost as well. After connecting it with a reservoir it is passed down as far as the triangular ligament, and the fluid runs out from behind forwards.

Syphilis is very common, with secondary and tertiary symptoms of all kinds. It is difficult to persuade natives to continue treatment when all symptoms have subsided. Many cases of advanced syphilis come under observation, in which there has been no previous treatment, and in consequence the manifestations are often much more severe than those now generally seen

in civilised countries.

Soft sores and buboes are excessively common,

especially among the uncircumcised natives.

The Masai and Nandi practise this rite, but none of the more western peoples in the Uganda Protectorate follow their wise example.

As far as I know the upper Nile tribes are also uncircumcised, except where they have come under Mahommedan influence from Egypt.

Diseases of special tissues and parts :-

Bones.—The commonest affections of the bones are periostitis and osteitis, generally of a syphilitic nature.

Caries and necrosis are seldom met with, except as a result of injury. Tubercular caries I have never

seen.

The same can be said in regard to the joints. Chronic rheumatic affections are common enough, but, unless as result of injury, I have seldom come across acute arthritic disease.

Chest.—Surgical diseases of the chest are also rare, except such as are due to traumatism. I had one case of pyo-pneumothorax this year in Kampala in a patient with advanced phthisis, but otherwise I have

never seen non-traumatic empyema.

Abdominal Diseases. - Hernia, umbilical and inguinal, are common, but otherwise surgical diseases of this tract are uncommon. Typhlitis and appendicitis do occur, but rarely. I have had two cases this year of acute general suppurative peritonitis, for which no cause could be traced at the post mortem.

Hæmorrhoids are very common among Europeans, but seldom occur amongst natives, probably owing to the fact that they are little troubled with constipation, in this respect their habits being most regular.

Fractures and dislocations are astonishingly rare, due, no doubt, to the fact that there are no beasts of burden, no wheeled traffic, and no machinery. The bones of a native must also be very strong, for an ordinary fall will scarcely ever result in fracture.

Diseases of Special Senses.—External diseases of

the eye are very common.

Cataract is, in my experience, rare, but I am informed by the Mission doctors that in their practice it is excessively common. I myself have had only two cases this year. Amongst the natives errors of refraction are either rare or else it is a condition which does not trouble them much, and, in consequence, they do not seek treatment.

Ear.—Inflammatory conditions of the external and middle ear are common enough affections. The hearing of natives is, as a rule, excessively acute, and I have seldom come across any other diseases in this

region.

Nose.—I have nothing to note in regard to the nasal tract beyond the fact that polypi are apparently very uncommon. I have never seen any myself, and no cases have been reported to me.

Male Genitals and Urinary Tract.—Non-venereal affections of this tract are not of frequent occurrence.

Stricture of the urethra is, as has been stated,

Chronic enlargements of the testicles are very common, but they are usually due to gummata or chronic gonorrhœal inflammations. Hydrocele is most common, but seems to be permanently curable by simple tapping. Calculi in the bladder or kidneys are of very rare occurrence.

Diseases of Women and Obstetrics.—As stated before, Government medical officers have very few opportunities for practice of this kind. The Mission doctors, however, inform me that they have a large amount of it among the Waganda, and that the diseases and complications which occur in no way differ from those of civilised life.

New Growths.—My experience in this connection illustrates the truth of my remarks in the preliminary observations of this Report. The Mission doctors inform me that in their practice new growths of all kinds are as common as at home. My own experience is exactly opposite.

I have seen during the eight years I have been in East Africa only one case of malignant growth. This was a scirrhous cancer of the breast in a woman at Mombasa. Small fibroid, fatty, and cystic tumours are not uncommon, but otherwise I should have said that neoplasms, both malignant and benign, are excessively rare.

A fatal case was reported to me from Unyoro this year as due to cancer of the stomach, but there was no post mortem so that the diagnosis was uncertain.

# Rews and Notes.

The Guimar Hospital for the Pure-air Treatment of Tuberculosis, Guimar, Teneriffe.—In the notice we gave of this Hospital in the Journal of August 15th, 1901, the impression conveyed was that the Hospital was only about to be opened. We beg to correct this impression, and to state that the Hospital is in full working order, and that patients are being received there regularly. The authorities draw particular attention to the fact that the Hospital is favourably situated as a sanatorium for persons invalided from the West Coast, more particularly from "fever." Although mosquitoes abound in the island malarial fever is unknown. The beauty and salubrity of Guimar, Teneriffe, will certainly attract invalids from all parts of the world.

# Current Literature.

PRELIMINARY NOTES ON THE INTERMEDIARY HOST OF FILARIA IMMITIS, LEIDY.

By THOMAS L. BANCROFT, M.B.Edin.

Filaria immitis is a large worm-parasite of the dog, common throughout the world, especially in the warmer parts; it is from five to ten inches in length, the males being much smaller than the females; it takes up its abode generally in the right ventricle of the heart and in the pulmonary artery. These worms are very prolific, producing large numbers of young, the so-called embryos; the latter swim about in the blood, a single minim of blood frequently containing twenty or more of them, the number depending, of course, on the number of fertile females in the dog; the embryo is about  $\frac{1}{90}$  inch in length by  $\frac{1}{3500}$  inch in breadth.

That distinguished scientist, the late Dr. Spencer

Cobbold, taught us that an intermediary host was necessary to transmit the parasite from dog to dog,

and his opinion was accepted as correct.

Many workers in various countries, more particularly Grassi, Sonsino and J. Bancroft, endeavoured to discover the intermediary host; the dog-flea, Pulex serraticeps, was suspected, but no one could trace the young filariæ in its body after the blood containing them was digested. The different dog lice and ticks were likewise examined but with negative results. The writer has been endeavouring for the past thirteen years to find the intermediary host; at first numerous examinations of the Pulex serraticeps were made, afterwards of the common horse fly Stomoxys sp.?; Culex vigilax, Skuse, a day-flying mosquito; the intestinal worm-parasite of the dog, the Anchylostoma or Dochmius trigonocephalus. All these animals abstract together with blood the embryos, but the latter appear not to enter upon a metamorphosis, and after several days can no longer be traced; it is

thought that they are digested.

It occurred to me as possible, that a metamorphosis was not necessary, but merely that the embryo should go through a cold stage for a few days in the body of an insect, after which should it gain entrance into a dog it would start upon its final development. To test this hypothesis, a feeding experiment on a puppy was made. The dog swallowed at various times during a month 110 Stomoxys flies gorged with filariated blood; in each fly there were about fifty embryos. Every month afterwards the dog's blood was submitted to microscopic examination; at the expiration of eight months two embryos were detected on a slide containing two minims of blood; a month later there were ten embryos in the same quantity of blood; the number, however, after this date did not increase; the dog was killed and search made for the mature worms-three only were found in the heart, two females and a male. Now were the hypothesis correct we should expect to have found hundreds of mature worms. This dog must have been infected whilst with its mother; it was three or four months old when I got it, and whilst under observation it was kept apart from other dogs. The experiment not only disproved the hypothesis, but served another purpose, viz., the time taken by the young filaria to arrive at sexual maturity was ascertained to be not less than seven months and not more than a year.

In the British Medical Journal, Nov. 3rd, 1900, p. 1306, there is a paper by B. Grassi and G. Noe of Rome, entitled "The Propagation of the Filariæ of the Blood exclusively by means of the puncture of Peculiar Mosquitoes." In this paper mention is made that Grassi, whilst engaged experimenting with the malarial mosquito, the Anopheles maculipennis, Meigen, Syn. A. claviger, Fab., had observed filariæ in them, which he traced to be developmental forms of Filaria immitis. To Grassi therefore is due the credit of having dis-

covered the intermediary host.

The authors of this paper remark: "The embryos of Filaria immitis, sucked up with the blood by Anopheles, migrate into the malpighian tubes, where they continue their development, behaving more or less like the other blood filariæ already known. The larvæ, arrived at the maximum development possible in the body of

Anopheles, abandon the malpighian tubes to enter the general cavity of the body, leaving behind the old cuticle; then they progress towards the head, and collect themselves there rapidly (as our transverse sections show very clearly) in the prolongation of the general cavity of the body within the labium, called also inferior labium (exceptionally also in the palpæ).

"By proper experiments we have demonstrated that when Anopheles bite these larvæ come out of the labium, and are thus inoculated in the bitten animal. The mechanism of exit represents one of the most singular and admirable phenomena that one can imagine for the diffusion of the parasites. .

When the mosquito proceeds to penetrate the skin the labium buckles up at first towards the base, forming an obtuse angle. As the stylets gradually penetrate, the angle is advanced towards the middle of the labium, becoming extremely acute, so much so that when complete penetration is affected the labium appears doubled upon itself, forming a narrow kind of loop, and this forms, through the conformation of the parts which close together, a new canal. . . is certainly through the bending of the labium stuffed with filariæ that is brought about the rupture of the integuments of the labium; along the dorsal groove and through the rupture thus produced come out the filariæ to penetrate the body of their definitive host.'

As the European mosquito, the Anopheles maculipennis, does not exist here, it is manifest some other insect must play the rôle of host in Australia. Early this year I was able to ascertain that the "House Mosquito," Culex Skusii, Giles, was the intermediary host. The embryos go into the malpighian tubes of the mosquito, as stated by Grassi, where they undergo a metamorphosis very similar to that of Filaria nocturna. In twelve days they have grown to a remarkable size and can be easily seen in the malpighian tubes and are capable of slight movements. In eighteen to twenty days they have arrived at maturity as far as their life in the mosquito is concerned; they have left the malpighian tubes and lie in the alimentary canal about the head, also in the labium; they are  $\frac{1}{20}$  inch in length by  $\frac{1}{800}$  inch in breadth.

If the proboscis of a filariated mosquito be cut off and mounted on a glass slide with cover-glass, and examined under the microscope, a slight pressure on the cover-glass being applied to cause the stylets to leave the labium, the young filariæ may be seen swimming up and down the apparent canal in the labium [what Grassi designates "the prolongation of the general cavity of the body within the labium "]; a little further pressure on the cover-glass causes the worms to escape at the extreme end of the labium. Whether there be a natural opening at the labellar end of the labium seems doubtful, but in every instance in which the experiment was made the young filariæ escaped at this point, and at no other.

In several works on entomology, giving descriptions of the mouth organs of dipterous insects [that are in my possession, there is no mention of a canal in the labium or of any opening at the tip. It seems to me that should no natural opening exist at the spot indicated, the young filaria would have very little difficulty in making one, and I believe that they

naturally do leave their intermediary hosts at this point; here they could wriggle into the wound made by the mosquito and would avoid any risk of being sucked up with the blood.

The young filariæ placed in water wriggle about but are quite unable to leave the spot where they happen to lie; it is not unreasonable to conclude that, as they are so helpless in water, they could scarcely swim against the blood stream entering the mosquito. There is still another objection to Grassi's idea of a rupture; this occurs when the labium is "stuffed with filariæ," but it would not be likely to happen when the labium contains a single worm as is frequently the case.

We are now able to give an exact account of the life-history respectively of Filaria nocturna and F. immitis. Starting with the sexually mature worms in man and dog, these produce embryos, which swim in the blood; the mosquito in biting abstracts some of the embryos; these develop in the mosquito's body and in about three weeks' time are capable of entering their final hosts should they get a chance of so doing. Sooner or later the mosquito may bite their final or definitive host, the filariæ seize the opportunity and pass into the puncture made by the mosquito in the skin; they now grow to sexual maturity, which probably takes about a year.

During the metamorphosis in the mosquito's body the position taken up by the filariæ serves to distinguish which is Filaria nocturna and which F. immitis, the former being in the thoracic muscles the latter being in the malpighian tubes; whilst at their maximum development the chief characteristic mark is their size, the young F. immitis being shorter and

thicker than the F. nocturna.

We have learnt that mosquitoes live long periods, not a few days as was formerly thought but months, and that during their lifetime they bice frequently.

It is a remarkable fact that in Europe the Anopheles maculipennis plays the rôle of host for the malarial parasite, for Filaria immitis, and it is believed also for Filaria nocturna; whilst in Australia the "House Mosquito," Culex Skusii, Giles [formerly thought to be a form of Culex ciliaris, Linn.], is host for Filaria nocturna and F. immitis, probably also for the

malarial parasite. I have recently found that dates, the dried fruit to be obtained from the grocer, are a most excellent food for mosquitoes, very much better than banana [which some years ago I had discovered to be a valuable food for mosquitoes in confinement]. Dates, as food for mosquitoes, have these advantages over banana, they may be kept in a jar in the laboratory and are conveniently to hand at any time; a pound weight of them will serve for numerous experiments; they do not go rotten or even mouldy; and there is no necessity, as with banana, to change for fresh every three or four days; a single date hung in the mosquito cage will serve throughout the experiment however long it might last. Mosquitoes fed on dates live longer, and many species that will not live in confinement more than three days on banana, e.g.,

<sup>1</sup> The "House Mosquito" of Australia appears to the writer to agree with the description given in Giles' work on Mosquitoes, p. 298, of Culex fatigans, Wied.

Anopheles musivus, Skuse, Culex vittiger, Skuse, thrive

on dates and live for upwards of a month.

In studying the life-histories of mosquitoes it is often necessary to induce them to oviposit in confinement. I have found that when the water vessel in the cage contains putrid water mosquitoes will often oviposit whereas they refuse to do so on clean water. It is prudent, however, to remove the eggs to cleaner water as the larvæ of many species cannot exist in putrid water. The water may be rendered suitably putrid by the addition of a little fresh cow-dung.

In a number of experiments made with the object of ascertaining whether certain very rare mosquitoes [that would not live in confinement in glass jars of the capacity of a gallon of water] would live in larger cages and under more natural conditions, I made a cage having a capacity of about a cubic yard in which were several living plants in pots and large vessels of water both fresh and salt, but the mosquitoes lived no longer in it. It seems therefore that nothing is gained by the use of such large cages.—Reprinted from Journal and Proceedings of the Royal Society of N. S. Wales, vol. xxxv.

## TROPICAL OPHTHALMOLOGY.

By M. T. YARR, Major, R.A.M.C. NIGHT BLINDNESS.

Dr. Trantas, ophthalmic surgeon to the National Greek Hospital at Constantinople, has published in the Semaine Medicale the results of his employment of "hepatic opotherapy" as a remedy for hemeralopia, or night blindness. In essential hemeralopia, that is to say, hemeralopia which is not symptomatic of retinitis pigmentosa, but which is observed in patients living under defective hygienic conditions, treatment usually consists in improving hygiene and alimentation, and administering tonic medicines, more especially cod-liver oil. Hippocrates recommended the ingestion of ox liver in large amounts as a cure for this disease; other practitioners in olden times also vaunted its efficacy, but in the present day it has fallen into disuse. Influenced by the success of modern opotherapy, Dr. Trantas determined to try this ancient nostrum in ten cases of hemeralopia which had resisted other forms of treatment, and was delighted to find a marked improvement in the night blindness commencing on the first or second day of administration, while the xerosis, which in some of the cases accompanied the affection, disappeared within ten to twelve days. No less than 200 grammes of boiled or roast ox and sheep liver were given daily. He attributes the success of this "hepatic opotherapy" to a regenerative action on the retinal pigment, and goes so far as to call the treatment infallible.

I have no experience of this form of treatment, which at first sight seems somewhat fantastic; however, Dr. Trantas is an ophthalmic surgeon and writer of established reputation, and any remedy which he extols as "infallible" deserves respectful consideration. In a paper contributed to the JOURNAL in April, 1899, I drew attention to the intimate connection between night-blindness, xerosis and keratomalacia,

and to their prevalence amongst the poorest classes in great towns in the tropics, such as Hong Kong and Bombay. All three appear to be ocular manifestations of general malnutrition. Mr. Sidney Stephenson, who has seen a great deal of xerosis amongst poor school-children in this country, considers it to be due to a bacillus—the "bacillus xerosis." Night-blindness without xerosis and without any other discoverable cause, such as retinitis pigmentosa, is, in my own experience, a very rare condition.

#### GLAUCOMA IN THE EAST.

Dr. Bitzos (Egypt) has an interesting monograph on "Primary Glaucoma in the East" in a recent number of the Annales d'Oculistique. Dr. Bitzos is an ardent advocate of the view that the fundamental and pathogenic lesion in primary glaucoma is a papillitis, leading to ædema of the vitreous by blocking the filtration channels which he contends exist in the papilla—a view which does not attract many adherents, and is unsupported by reliable evidence. Part of his paper is taken up with the exposition of this theory, but his description of the modified form of glaucoma seen in Egypt will prove of more general interest.

"The only evidences of glaucoma (i.e., primary) observed in the East are glaucomatous papillitis and excavation, with the concomitant papillary and peripapillary alterations. Glaucoma in the East is, save in very rare cases, a mitigated disease, chronic, evolving very slowly and insidiously. It begins and progresses stealthily; the patient does not complain of pain, iridopsy (colours round lights), or any other distressing symptom; and if one eye remain unaffected he often only finds out by accident that vision is going, or gone, in the other. Examined objectively, a "glaucomatous papillitis" is found if the case be seen early, or a more or less considerable excavation if observed at a later stage. The glaucomatous halo is usually present but is relatively small. Hypertony (increased tension) is feeble but constant, rarely exceeding + 1. The iris is but slightly advanced, and consequently the anterior chamber is not noticeably shallower; as a rule the pupil is slightly dilated and its colour rarely indicative of glaucoma. The colour of the iris is seldom altered. Up to a certain point the visual field contracts concentrically; nearly always the last part to disappear is the temporal side. The glaucoma is, so to speak, simplified, and reduced to its essential elements.

Monsieur Bitzos finds the mean ocular tension low amongst natives of Egypt, and is inclined to attribute to this the relative infrequency of myopia and senile cataract.

## MALARIAL IRITIS.

I have read with great interest Mr. White's excellent report of three cases of malarial iritis observed by him in Uganda and the East African Protectorate (vide Journal of September 16th). Mr. White writes very judicially, and is careful to avoid committing himself to a definite assertion of the exclusively malarial origin of the disease in his cases, but to my mind the evidence he adduces is conclusive in all three. That there is a specifically malarial form of iritis I am convinced, and Dr. White's paper goes

far to prove this. I am indebted to this gentleman for his flattering reference to my own contributions to the working out of this interesting subject.

To Avoid "PRICKLY HEAT."—Not a few people are distressed during the hot months with an itching and burning sensation of the skin, accompanied by a fine eruption. This is caused by the perspiration, which cannot readily evaporate and thus produces the irritation. As stated in Clin. Med., it will be found better to resort to soap and water, used frequently, and to avoid alcoholic and alkaline washes. Once a day, perhaps, the irritated parts should be gently bathed, then dried thoroughly, and afterwards anointed with cocoanut oil. It is absorbed readily and should be applied with the hand. It is not greasy and will not soil the clothing unless an excessive quantity is used.

# Letters, Communications, &c., have been received from :-

A.—Mr. G. Allen (London); Major W. Alpin, T.M.S. (Jhansi); Dr. David Alexander (Jamaica).

B.—Dr. W. Leonard Braddon (Lerambau); Dr. Oswald Browne (Advie, N.B.)

C.—Count de Cardi (London).

H.—Dr. Harrison (Belize); Sir Clement Hill (London). M.—Dr. J. Preston Maxwell (South China); Dr. Massiah

N.—Mr. W. A. T. Nottingham (W. C. Africa); Dr. H. Alford Nicholls (Dominica); Dr. G. H. F. Nuttall (Cambridge).
P.—Dr. W. G. Tottenham Posnett (Bloemfontein).

R.—Dr. Edw. Read (Lagos).

S. - Dr. A. Sims (Matadi).

T.—Dr. R. M. Townsend (Bulawayo).
Y.—Major M. T. Yarr, R.A.M.C. (Dublin).

#### EXCHANGES.

Annali di Medicina Navale. Archiv für Schiffs u. Tropen Hygiene. Archives de Medicine Navale. Archives Russes de Pathologie, de Médec., Clinique et de Bacteriologie, Australasian Medical Gazette. Boletin de Medicina Naval. Boston Medical and Surgical Journal. Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology. British Medical Journal. Brooklyn Medical Journal. Caducée. Climate. Clinical Journal. Clinical Review. Giornale Medico del R. Esercito. Hongkong Telegraph. Il Policlinico.

Indian Engineering. Indian Medical Gazette. Indian Medical Record. Journal of Balneology and Climatology. Journal of Laryngology and Otology. Journal of the American Medical Association. La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal. Medical Brief. Medical Missionary Journal. Medical Record. Merck's Archives. New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyclinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo. Sei-i-Kwai Medical Journal. The Hospital.

The Medical and Surgical Review. The Northumberland and Durham Medical Journal.

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1.—All communications will be acknowledged in the JOURNAL under the heading "Letters and Communications Received." Contributors who do not see their names in the list should communicate forthwith with the Editors or Secretary.

2.—Manuscripts sent in cannot be returned.

3.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

4.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

5.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Editors.

6.—Correspondents should look for replies under the heading "Answers to Correspondents."

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In order to meet the constant enquiry for addresses of respectable firms catering for the various requirements so difficult to obtain abroad, we give a list of names and addresses which we trust will be found useful to our numerous correspondents and subscribers.

# Original Communications.

BERI-BERI AND THE HEART.

By ARTHUR STANLEY, M.D., B.S.Lond., D.P.H. Health Officer of Shanghai.

THE following observations have been made on a series of 341 cases of beri-beri during three years' work at the Municipal Isolation Hospital in Shanghai. The number of deaths in the series was seventy-two, the average time at which death took place after admission being twenty days. The cases were drawn from among the Chinese prisoners of the Municipality. There is no evidence of an exceptional incidence of beri-beri amongst the Chinese population generally, but the number of cases among native prisoners under foreign municipal supervision is excessive. The 341 cases were furnished from among 2,000 prisoners, 17 per cent. suffering from beri-beri. What the factor is which causes this difference in incidence still remains undetermined. Overcrowding has been removed without any definite improvement; the source of food supply has been changed, beef has been added to the diet, and methods of strict isolation and disinfection of cases have been adopted, without diminution in the number of cases. The Chinese, though very careful with the storage of rice, especially when decorticated, do not recognise any disease as caused by its consumption. The prisoners get no alcoholic liquor. They have plenty of fresh air during the day, but are somewhat cramped at night; they have regular exercise, and as far as can at present be ascertained, good food.

With regard to the mode of onset and special symptoms, it would appear that the division into dry and wet, or into paraplegic and dropsical cases, is

misleading. Practically, all cases in the beginning had cedema (most easily detected along the flat of the tibia), and cases which became paralysed without previous cedema were rare. The cedema may be so slight as to be easily missed, unless especially looked for. It can, however, be understood that cases arising among prisoners always under medical observation afford exceptional opportunities for observing the disease from its onset. Among ordinary cases, treatment would often not be sought until paralysis had developed. As a rule, cedema along the front of the tibia, loss of knee-jerks, and the markedly abnormal heart condition mean beri-beri. Anæsthesia is a sign difficult of accurate delimitation among Chinese.

A patient examined soon after the onset of beri-beri has a full and rapid pulse of fair tension, the heart impulse exaggerated, and the first sound normal. Gradually, however, the toxemic condition manifests itself; the first sign is the result of degeneration of the heart muscle, which, being less resistant than nervous tissue, precedes the action on nerve, shown by loss of motion, sensation and tendon reflexes. The heart signs are those produced by weakness of heart muscle, namely, lowered pulse tension, feeble pulse wave, feeble heart impulse, short first sound and accentuated pulmonary second sound. This condition of lessened heart-power may continue far into convalescence. Towards the end of the first month of the disease, what may be called the "beri-beri heart" is well established. The patient is pale and languid; the pulse is of low tension, the wave short and illsustained, of moderately increased speed, greatly accelerated by even slight movement, and sometimes irregular, both in rhythm and force. The superficial veins are rarely distended. The heart more often than not is of normal size, but may be dilated, the apex moving outwards. The cardiac impulse is usually feeble, and when there is dilatation, diffuse. Not rarely the heart's action is bounding and apparently forcible, but the actual circulatory output, as measured by the pulse, remarkably feeble by comparison, there

<sup>&</sup>lt;sup>1</sup> The percentage of cases which occurred in the Japanese Navy prior to 1885, when the change to more albuminous diet was made, varied from 40 to 13 per cent. of strength.

being a marked difference between the violent overaction of the heart and the small feeble pulse. The first sound is short, the pulmonary second sound is relatively loud, and there is almost always reduplication of the second sound, most marked on listening over the third left costal interspace. Systolic murmurs are frequent, both at base and apex, and in the carotid arteries.

Changes in the length of the pauses of the heart cycle are frequent and of great importance in prognosis. Most common is a shortening of the long pause, giving rise to spacing of the heart sounds. The relative shortening of the long pause may be of all degrees up to "tic-tac" rhythm, where the short equals the long pause, so that the heart sounds are equi-distant. The change in the relative length of the two pauses is almost always accompanied by a change in the character of the sounds, the first sound becoming like the second in quality, losing its deep, so-called muscular sound, and making more audible the valvular sound, which resembles the ordinary valvular second sound. In this way the two sounds and the two intervals tend to become alike. This "tic-tac" rhythm, caused by the shortening of the long pause—the recuperative interval-points to diminished cardiac recuperative power and indicates danger aheaddanger of heart-failure. But of worse prognosis is that condition where, in addition to the long pause being shortened, the short pause is likewise shortened, so that the second sound follows very closely on the first. This condition is almost always a fatal sign, and occurs with or may be followed by heart-failure.

A condition characterised by what may be termed delayed beats, or "tumbling" rhythm, is a common form of irregularity of the heart's action in beri-beri. After a series of regular heart beats a pause occurs, followed by a sudden scramble of two or more heart beats, in order, as it were, to make up for lost time. This gives rise to an intermittent pulse, because all

the beats do not reach the wrist.

# HEART-FAILURE.

As in diphtheria so in beri-beri, sudden heart-failure is the most terrible complication, and one in which as a rule no treatment is available in preventing death. So marked a feature is this of beri-beri that the Japanese have given the name of "Shiō-shin" (signifying literally "heart-stroke") to this mode of fatal termination. Beri-beri and diphtheria are the diseases par excellence in which sudden heart-failure manifests itself. And this connection with diphtheria—a disease which is also associated with peripheral neuritis—is a suggestive leading motive in etiology. In beri-beri, as in diphtheria, the occurrence of vomiting is almost the invariable herald of a rapid fatal termination by heart-failure.

Heart-failure is usually made manifest by the following symptoms-post-sternal pain, restlessness, lilac-tinted pallor, vomiting, dyspnæa and irregular respiration, increasing weakness of the pulse and coldness of the extremities. These symptoms occurring together denote a fatal termination. The syncopal attack is marked rather by duration than by intensity; loss of consciousness is rare. The date of onset of heart-failure is most commonly towards the end of the

first month of the disease and, as a rule, before any

skeletal muscular paralysis is obvious.

Heart-failure is always preceded and accompanied by changes in the heart rhythm. The first pause is usually shortened so that there is a rapid sequence of the second sound after the first. The condition is frequently preceded by apparent spacing of the sounds, the result of shortening of the recuperative interval. Some dilatation in the heart is frequent but not invariable. Reduplication of the second sound is common; reduplication of the first sound is not unusual, and the cause of cantering rhythm.

# A TYPICAL CASE OF SUDDEN HEART-FAILURE (Shio-Shin) in Beri-Beri.

Chang Kee, male, Chinese, aged 30, coolie in a Ginseng shop, and for last two months a convict in the Municipal Gaol, was admitted to the Shanghai Municipal Isolation Hospital on September 21st, 1900;

died October 20th, 1900.

Before admission to hospital he had swelling of the legs for one week and some epigastric pain. Two weeks after admission the patient was apathetic, face pale and puffy, and the cedema general, including the There was no albuminuria. No sign of scrotum. motor loss, but knee-jerks absent. No tenderness of muscles; some loss of touch sensation below the knees, difficult of accurate delimitation.

Three weeks after admission the pulse wave was short and ill-sustained—90 a minute, occasionally intermittent, tension low. On sitting up in bed the pulse was quickened to 130 a minute; wave and tension still more diminished, with breathlessness. Heart impulse feeble and diffuse when lying down but thumping when sitting up. Maximum impulse under the nipple. Deep cardiac dulness extended from one and a half inches outside vertical nipple line to the middle of sternum. There was no dulness to the right of the sternum in the fourth right interspace (right auricle). Auscultation near the nipple found the first sound muffled, short, and quickly followed by the second, which was relatively loud. There was a soft blowing systolic murmur at both apex and base but not in axilla. The second pulmonary was accentuated and the second sound reduplicated.

Thirty days after admission began to vomit, and complained of post-sternal pain; was more restless; lips became lilac-tinted; breathlessness increased; thumping over-action of the heart and epigastric pulsation. Deep cardiac dulness extended from two inches outside vertical nipple-line in fifth left interspace to one inch to the right of sternum in fourth right interspace. There was cantering rhythm of the heart due to reduplicated first sound; the second sound was also reduplicated. The pulse became increasingly weak and the extremities cold, death supervening within six hours of the onset of vemiting.

Analysis of 341 (	ASES	OF BE	RI-BEI	RI.
Fatal cases				
Cases dying of rapid heart	failur	е		
Pulse tension lowered				
Dilatation of the heart				
Second sound reduplicated				
First sound reduplicated				
Long pause shortened				
Short pause shortened				
Cardiac murmur			7.0	

#### DILATATION OF THE HEART.

Dilatation of the heart occurs more frequently in association with beri-beri than it does with diphtheria, and, considering the degenerated condition of the cardiac wall, the comparative infrequency may be explained by the low arterial pressure which obtains. In beri-beri, however, the process is a less acute one than in diphtheria, and, though the toxin produces similar changes in the heart muscle, it acts through greater periods of time causing more cardiac wear and tear. The special effect of both beri-beri and diphtheria on the heart is to produce a marked diminution of force leading to defective arterial pressure, hence the low tension pulse, and the frequency of syncopal attacks. Signs of cardiac dilatation may be marked by those of pericardial effusion. The degree of dilatation can be best measured by percussion of the deep cardiac dulness-the enlargement of this to the left being a fairly accurate index of the increased size of the heart. The superficial cardiac dulness merely shows how much of the surface of the heart remains uncovered by lung and is no index to its actual size. Dilatation of right auricle (easily detected by percussion of the fourth right interspace) and weakness of the right ventricle (detected by palpation of the epigastric region) are usually accompanied by considerable dyspucea and often by some lividity. But it is the dilatation of the left ventricle which causes the urgent danger of death from syncope, and neglect of this indication may cost the patient's life.

## CHANGES IN THE HEART-RHYTHM.

Changes in the heart-rhythm may be briefly stated as follows:—

(1) Shortening of the long pause, giving rise to spacing of the heart sounds or "tic tac" rhythm.

(2) Shortening of the short pause, the second sound following the first rapidly—a sign of grave import.

(3) Lengthening of the long pause, causing infre-

quent heart-beat and slow pulse.

(4) Laboured over-action or excited action of the heart, a condition of irritable weakness where there is much show of force but little result.

(5) "Delayed" heart-beat occurring at rhythmic intervals and giving rise to intermittent pulse. "Tumbling" action of the heart—"hesitating heart" being a slight form of this.

(6) Irregularity in force and frequency apart from above.

(7) Reduplication of heart sounds, especially of the second sound. "Cantering rhythm," usually from reduplicated first sound—a fatal sign.

(8) Murmurs.

Disturbance of the respiratory rhythm is an occasional accompaniment of change in the cardiac rhythm—such as sighing respiration, which is a bad prognostic; very slow respirations, with a normal pause between each; quick respirations, with a long pause between each; conditions also with a quick inspiration followed by a slow expiration; and again, typical Cheyne-Stokes breathing.

The frequency of the heart's action in beri-beri is almost always above normal, and, as a rule, the lower

the arterial tension the greater the frequency.

The frequency of reduplication of the second sound

is remarkable. "Cantering rhythm," when present, is almost always accompanied by dilatation and followed by death; the canter is usually due to an apparent reduplication of the first sound, and when the three steps are equi-distant, death is near. To get etiological leading-motives, it becomes necessary to consider the mechanism of the changes in heart rhythm observed. In "tic-tac" rhythm, when the long pause or recuperative interval is shortened, a vicious circle is established. The heart is weak and is rendered still more so by diminished recuperative rest. The condition, therefore, leads to the still worse condition where the short pause is shortened, the second sound following the first sound more quickly than normal, due probably to the heart being brought up short by the resistance in front of it in the arterial system. Thus the condition tends to go from bad to worse, and, as in the heart it is "all or nothing," a stage is reached when the circulation can no longer be maintained and the heart ceases function suddenly-sudden heartfailure, the "Shio-shin" of the Japanese, whose literal translation is "heart-stroke."

Murmurs are frequent and are possibly due to some yielding of the mitral or tricuspid curtains, yet most usually come under the category of so-called "hæmic

murmurs.'

#### CONCLUSIONS FROM CLINICAL OBSERVATIONS.

Heart-failure may occur prior to any manifestation of disturbed innervation. As in diphtheria, so in beri-beri, heart-failure often supervenes before any paralysis has appeared—about the end of the first week in diphtheria, towards the end of the first month in beri-beri. The cardiac muscle is the prime factor in the circulation. The heart, in contradistinction to the skeletal muscles, partakes of the nature of an automatic mechanism, though influenced through the vagus and sympathetic nerves. No extra-cardiac trophic nerve to the heart is as yet known. To attribute heart-failure in beri-beri or diphtheria to a neuritis of the vagus is alike unnecessary, inadequate, and

unproved.

To a certain extent heart-failure and changes in the rhythm occur in other acute specific diseases which do not, or only rarely, produce peripheral neuritis, such as typhoid fever, influenza, plague, and acute rheumatism. In these and in arsenic and alcohol poisoning a somewhat similar condition of the heart is found post mortem, as in beri-beri and diphtheria, namely, one of parenchymatous degeneration of the heart muscle. To explain the unusual frequency of heart-failure in beri-beri and diphtheria, it is necessary therefore to establish that the degeneration of the heart muscle is more marked in these than in other toxin diseases where heart degenerations are produced. Post-mortem examination does establish this. That the toxin of diphtheria has a special predilection for heart muscle is also borne out by experiments on animals. Alcohol is another toxin, the product of a micro-organism, which produces peripheral neuritis, and has a specific degenerative action on the heart muscle. Some cases of alcoholic neuritis with dilated heart and cedema are almost indistinguishable from beri-beri, and death may take place from sudden heart-failure. In arsenic neuritis also death not infrequently takes place from sudden syncope, and localised ædema has been

Muscle is less resistant and therefore more quickly acted upon than nerve, and hence the heart changes occur, as a rule, at an earlier date than nerve degenerations. The results of muscle degeneration, through direct actions of the toxin, manifest themselves before those of muscle degeneration the secon-

dary result of trophic nerve change.

The suddenness of the heart-failure does not, however, indicate a sudden lesion. In an involuntary muscular organ like the heart it is "all or nothing" either it acts with sufficient force to maintain the circulation, or it ceases altogether, and often suddenly. The stoppage of the heart, though sudden, may therefore be really due to a gradual accumulative weakness, and this is borne out by clinical experience. That the heart-failure also is not due to a general loss of vitality, but rather to a specific effect on the heart itself, is evident from the marked distinction between the condition of the heart and the comparatively good general physical and mental condition even a short time before death from heart-failure.

In conclusion, the circulatory physical signs point to a weakness in circulatory power, due to primary

degeneration of the heart muscle.

POST-MORTEM CONFIRMATION OF CONCLUSIONS FROM CLINICAL OBSERVATIONS.

Sidney Martin has shown that the diphtherial albumoses produce an advanced degree of fatty degeneration in the heart muscle, and he was unable to find any degeneration in the vagus nerve. Mott<sup>2</sup> found fatty degeneration of the heart muscle in each of the four cases of diphtheria paralysis which he examined, but in only one of them was there degeneration of the peripheral nerves. Poynton<sup>3</sup> has recently published a comparative study of the condition of the heart wall in diphtheria and rheumatism respectively, and has described very marked degeneration of many of the cardiac muscle fibres, and complete destruction of some parts of them. Mott and Halliburton,4 by making an alcoholic extract of the blood of a beri-beri case, filtering, evaporating to dryness at 40° C., dissolving the residue in normal saline and injecting into the jugular veins of an anæsthetised cat, showed that the blood contained a substance which, like choline, produced a fall of arterial pressure, slowing of heart's action and dilatation of heart. The beriberi case was found post mortem to show extensive degeneration of the peripheral nerves and fatty degeneration of the muscles, including the heart. The substance in the blood therefore resembling choline may have been rather a product of this fatty degeneration.

Giacomelli<sup>5</sup> has made a series of experiments on animals with the object of ascertaining the changes in the myocardium produced by various toxin diseases and poisons. More or less marked alterations were constantly seen, for the most part confined to the

heart muscle itself, sometimes, but rarely, affecting the interstitial connective tissue or the vessels. changes in the connective tissue were generally associated with the presence of micro-organisms, and consisted of diffuse lymphoid infiltration. There was no causal relationship between the changes in the connective tissue and vessels and those in the heart muscle; the two existed independently. The changes in the heart muscle varied from simple atrophy to fatty degeneration and destruction. There were no definite anatomical lesions corresponding to definite specific poisons. The changes were due to the direct action of the bacterial toxin and poison on the muscle fibre itself, and were sufficient in themselves to cause cardiac failure.

On account of the insuperable difficulty of making autopsies on the Chinese subject it has been impossible to confirm these observations in Shanghai.

The importance of the clinical evidence of heart degeneration lies in the fact of the warning it gives and the possibility of preventing the onset of heart failure by an unusual degree of care with the object of saving the labour of the heart as much as possible.

Cardiac failure is undoubtedly the commonest cause of death in beri-beri, and this clinical association of beri-beri, diphtheria, influenza, alcoholism, and arsenic poisoning gives an important etiological clue, which in association with ergotism, pellagra and lathyrism, it is proposed to closely follow.

#### CONCLUSIONS.

(1) Beri-beri has a marked degenerative action on the heart muscle, which frequently causes fatal circu-

latory failure.

(2) In this respect beri-beri resembles other toxemic diseases, such as diphtheria, influenza, and alcohol and arsenic poisoning, which often cause peripheral neuritis, and also other toxemic diseases, such as typhoid fever, plague, and acute rheumatism, which do not or rarely give rise to peripheral neuritis.

(3) Beri-beri and diphtheria are the diseases par excellence in which sudden fatal heart-failure occurs.

(4) The heart muscle degeneration is not a secondary

result of neuritis of the vagus.

(5) The heart muscle degeneration takes place as a rule before skeletal muscle degeneration, and is the result probably of direct action of the toxin, and not

a secondary result of nerve change.

(6) Sudden heart-failure does not indicate a sudden lesion, but rather is the result of a gradually increasing heart weakness from cardiac muscle degeneration, which may be precipitated by any sudden exertion, but more frequently is the result of the principle of "all or nothing"—the transition from "all" to nothing being necessarily rapid.

(7) The cardiac physical signs in beri-beri closely resemble those found in diphtheria,6 and are of paramount importance in prognosis and treatment.

A PLANT that grows in India, called the Philotacea electrica, emits electric sparks. The hand which touches it immediately experiences a shock .- Monthly Magazine of Pharmacy

<sup>&</sup>lt;sup>1</sup> Goulstonian Lectures, 1892.

Croonian Lectures, 1900.

Lancet, May 12th, 1900.
 Brit. Med. Journ., July 29th, 1899.
 Il. Policlin., An. viii., f. 3, 4.

<sup>&</sup>lt;sup>6</sup> Metrop. Asylums Bd. Rep., 1897, p. 180.

# British Medical Association.

# A DISCUSSION ON MALARIA AND ITS PREVENTION.

(Continued from p. 341.)

IV.—THE INOCULATION OF MALARIA BY ANOPHELES.<sup>1</sup>
By Captain C. F. Fearnside, I.M.S.

THE Central Prison of Rajahmundri, Madras Presidency, is one of the most malarious gaols in India, and from the years 1880-1897 no less than 60 per cent. of admissions for malarial fever in all the larger gaols of this Presidency were accounted for by this prison. In no fewer than seven years, between the above-mentioned dates, the admission-rate from this

cause exceeded 1,000 per mille.

In 1889 Dr. Manson suggested that I should make investigations to see how far the Anopheles mosquito was the bearer of the malarial organism. In November last I dissected forty free Anopheles which had at some time or other been feeding on the blood of the prisoners, and I found malarial sporozoites in one, that is, 1 in 40. The prevalence of malaria in Rajahmundri and its prison makes the experimental inoculation by Anopheles a difficult matter, and this point must be borne in mind dealing with the question. There are six varieties of Anopheles in Rajahmundri, and the one used was of a light fawn colour commonly found all the year round. The infected mosquitoes were kept in a Bohemian beaker, the mouth of which was covered with a piece of muslin. In this paper I have endeavoured to show that the zygote grows primarily in the epithelial layer of the stomach, and that it gradually pushes the middle coat outwards, and finally appears as a bud lying between the fibres of the outer or muscular coat.

The sporozoites are very numerous in the venenosalivary gland from the tenth to twelfth day after infection. From the fifteenth day after haustellation the numbers decrease, so that there are few sporo-

zoites in the gland on the nineteenth day.

The infected mosquito can only infect a limited number of persons, and, further, to give a successful inoculation a considerable number of sporozoites must be infected, because if a small number only find their way into the blood the phagocytes destroy them. Of seventeen Anopheles fed on blood containing summer-autumn parasites and crescents nine were found to contain Ross's cysts. The failures I have explained, and the conclusion is that seventy approximately became infected. Of seven fed on blood containing spring tertian parasites all became infected.

Eight persons were inoculated, and of these seven contracted fever. The blood on which the *Anopheles* fed originally was examined and the parasite recorded, the blood of the person inoculated was examined from time to time and also recorded. The incubation period is from twelve to twenty-five days for both types of

fever.

My own case is the most authentic, because I have been in the best of health snice 1891. The experi-

ment in the tropics is not without danger and inconvenience. From January till the second week in April I was always more or less ill and had occasional attacks of fever. What gave me most trouble was a catarrh of the bowel and loss of appetite, and I lost almost a stone in weight during that period. I have now been home two months and am as well as ever. Another "victim" had one of the severest attacks of malarial jaundice that I have ever met with in the tropics.

The presence of malarial zygotes in the stomach and of sporozoites in the salivary glands, the attack of ague soon after the bite, twelve to twenty-five days (incubation), the presence of similar parasites in the blood of the inoculated corresponding to those found in the blood of the person who was the source of the infection, is strong presumptive evidence that the fever

was produced by the infected Anopheles.

The prevention of the spread of malaria by means of zinc-proof houses and mosquito curtains is out of the question in India. To put the native population—men, women, and children, who sometimes have only sufficient money to keep body and soul together—under mosquito nets and in mosquito-proof houses is impossible. The next suggestion one hears of is the destruction of Anopheles. If this is to be done properly the rice fields, which are the main source of food throughout a great part of India, will have to be abolished. Is the population to starve in the meantime? Famine has been quite bad enough in recent years without the abolition of these fields.

The last remedies are the freer use of quinine and the segregation of infected individuals. The former seems the more practical, but the segregation of infected natives will be as difficult a task as the

wholesale slaughter of the Anopheles.

#### V .- Notes on Cyprus Fever.

By George A. Williamson, M.A., M.D.Aberd. District Medical Officer, Larnaca, Cyprus.

The mistaken ideas so prevalent in England with regard to the climatic diseases of Cyprus lead to the hope that the following few notes may not be without their use:—

What would be understood by a person unacquainted with the island and its diseases by such a term as "Cyprus fever"? Surely it would mean either a fever peculiar to Cyprus, or the fever most commonly met with there.

Now it should be fully recognised that there is no disease in the island peculiar to Cyprus; while the reports of medical officers in Cyprus, since the occupation in 1878 up to the present time, all go to show that malaria is the most common fever.

#### Nomenclature.

The giving of local names to diseases is confessedly a bad plan, as it so frequently happens that the disease in question is later on found to occur in many other places, in which case the original local name is plainly a misnomer. A typical example of this is seen in the affection now commonly called "Oriental sore," but which was formerly known by the titles, amongst others, of Delhi boil, Biskra button,

<sup>&#</sup>x27; This paper appeared in the "Scientific Memoirs by Medical Officers of the Army in India."

and bouton d'Aleppe; such a system must lead to confusion, and to give the name of "Cyprus fever" to any disease met with here would only be to fall into this mistake.

The Cypriotes frequently speak of "local fever" (ἡ θέρμη τοῦ τόπου) meaning generally by this malarial fever, but the term is so loosely applied that it includes many diseases other than this, and is therefore of no value.

Dr. Carageorgiades, of Limassol, in his pamphlet "Cyprus Fever, or Febris Complicata in Cyprus,"1 describes undulant fever, and distinctly states it to be so, as, amongst synonyms for Cyprus fever, he gives Mediterranean fever, Malta fever, rock fever of Gibraltar, and Neapolitan fever, all of which are universally acknowledged as being simply synonyms for the disease so well named by the late Major Hughes, R.A.M.C., "undulant fever." In this pamphlet reference is made to Dr. Veale's report on the fever to which he gave the name of "febris complicata." The identity of Cyprus fever (Carageorgiades) and febris complicata (Veale) with undulant fever (Hughes) is discussed and proved in Hughes's "Malta, Mediterranean, or Undulant Fever," and need not be further insisted on; as this disease is found also in at least the following countries: France, China, India, Africa, Greece, and Turkey, the title of Cyprus fever can hardly be regarded as deserved.

The Colonial Office printed in 1886, a "Report on the Fevers of Cyprus," by Dr. Heidenstam, the Chief Medical Officer. In this the fevers described are all malarial in their nature, comprising (a) intermittent (with varieties—algid, choleraic, apoplectic, pneumonic and neuralgic), and (b) remittent. The following paragraph from this report may be quoted here: "The difference existing between fevers consist principally in the cause from which the fever is derived. intermittent and remittent are due to palus or paludal miasma known as malaria, and this is the principal form which exists in Cyprus, increasing or decreasing according to the circumstances favouring or disfavouring their origin, and the assumption that those fevers may result from other causes than from infection of malaria is simply puerile, and not based on correct principles." Here Dr. Heidenstam gives it as his opinion that in his wide experience of Cyprus and its fevers, malarial fever is the principal form met with; he does not discuss undulant fever.

## Personal Experience.

During my residence here since 1895, I have had excellent opportunities of studying the diseases of the country, and no special disease found here and here only has been observed. The "fevers" commonly met with are most certainly malarial, as proved by microscopical examination of the blood, as well as by the usual clinical signs; a febricula, to be described later on, is also common; undulant fever is met with occasionally; no mention is made now of the exauthematous fevers, such as measles, which occasionally appear in epidemic form.

#### Febricula.

The febricula referred to above appears to be the same disease as the "ephemeral fever, febricula, or simple continued fever" described by Sir Joseph Fayrer as one of the fevers of India. In Cyprus it seems to be connected with the digestive system, the patient having complete anorexia, constipation, or more rarely diarrhoea, vomiting, white-coated tongue, headache; the raised temperature—rarely over 104° F.—lasts from two days to a week or ten days at most; complete recovery ensues; repeated examinations of the blood fail to show malarial parasites.

In the treatment quinine is unnecessary, except in tonic doses of a grain or two, and then chiefly after the fall of the temperature, when also cinchona bark, and ammonium carbonate are useful. An early purge followed by a diaphoretic mixture is all that is medicinally required during the height of the attack; for the headache, cloths wrung out of cold water may be applied to the head; liquid diet for two or three days will be necessary.

Reference to Captain Porter's article on "Simple Continued Fever in South Africa" will show that this simple fever is common in South Africa also, and it will be noted that the treatment recommended by Captain Porter is much the same as that mentioned above. It is worthy of mark that this disease occurs in places so widely apart as India, South Africa, and Cyprus, and therefore cannot be called "Cyprus Fever.'

## Undulant Fever.

Undulant fever undoubtedly does occur in Cyprus, but is not common. During the first six months of this year only one case has come under my notice. It should be noted that the differential diagnosis between this and enteric fever is at times very difficult, chiefly in cases of enteric fever where, as frequently happens in warm climates, constipation rather than diarrhoea is a marked symptom.

# Malaria in Cyprus.

With regard to malaria, it is admitted on all sides that the pernicious malarial fevers are now not nearly so frequently met with as formerly, and this amelioration is ascribed chiefly to two factors: (1) The draining and filling-up of marshes; and (2) the planting of trees in places which were formerly marshy grounds. The principal forms of malaria met with are tertian and quartan fevers (the varieties of these, double tertian and double and triple quartan, being included and not separated as quotidian). Experience in these forms impresses one with the fact that quartan is a much more difficult fever to cure permanently than tertian, attacks - evidently returns and not fresh

<sup>&</sup>quot;"Cyprus Fever, or Febris Complicata in Cyprus," by John Carageorgiades, M.D., K.M., &c., Limassol, Cyprus, 1891.

2 "Malta, Mediterranean, or Undulant Fever," by M. Louis

Hughes, Surgeon-Captain, Army Medical Service, London, 1897.

With special reference to p. 10 of that book.

3"Report on the Fevers of Cyprus," by Dr. F. C. Heidenstam,
C.M.G., Chief Medical Officer of Cyprus. Colonial Office, May,
1886. Mediterranean. No. 23.

<sup>4 &</sup>quot;The Climate and Some of the Fevers of India," by Sir

Joseph Fayrer, Bart., M.D., F.R.S., &c., on page 314 of "Allbutt's System of Medicine," vol. ii.

5 "Simple Continued Fever in South Africa," by Captain F. J.
W. Porter, R.A.M.C., British Medical Journal, June 15th, 1901,

confusion.

infections-occurring after intervals of time amounting even to months. This frequency of quartan fever may be accepted as evidence of the island not being a country dangerous to Europeans on account of its malaria as it has been found, and the fact is regarded as an axiom that where quartan fever is common the fatal forms of malaria are more rarely met with.

From February 12th to June 30th, 1901, I examined the blood of ninety persons whose symptoms suggested they might be suffering from malaria or from some other disease complicated with malaria, and Table I. shows the result of this examination. The first case presenting crescents in the blood was observed on June 20th.

#### Table I.

Number of persons examined	90
Number of cases diagnosed as malaria, of which	
7 had been under quinine before date of	Sec.
examination	42
Parasite of quartan fever found in	8 cases.
", ", benign tertian fever found in	
,, " estivo-autumnal fever found in	
Small ring forms, variety not recognised, found	
in	8
Pigmented leucocytes only found in	2
Diagnoses, other than malaria, in 48 cases wer	re febricula.
gastritis, phthisis, bronchitis, dyspepsia, anæmia,	supraorbital
neuralgia, debility, puerperal fever, pleurisy abscess	s diarrhosa
enteric fever, hepatic congestion, tonsillitis, undular	of foron
theorie level, hepatic congestion, tonsinitis, undular	it lever.

#### Table II.

Number	of persons	treated		 	1,316
Number	of cases of	malarial	fever	 	55
,,	,,	febricula		 	29
,,	,,	undulant	fever	 	1

Table II. shows the prevalence of the various diseases, malarial fever, febricula and undulant fever, among 1,316 persons treated for different diseases from January to June, 1901. This clearly shows that febricula and malaria were the diseases (of the three mentioned) most commonly seen, and the frequency with which quartan and benign tertian fevers were met with in comparison with æstivo-autumnal fever will show that it is the milder forms of malaria that are common, at least during this part of the year, and the small proportion of cases of malaria to other classes of disease (these are precisely what are met with in the ordinary run of practice in the United Kingdom) will tend to show that Cyprus is far from being the fever-stricken island it is sometimes supposed to be.

# Mosquitoes.

No reference to malaria would now be complete without a word as to mosquitoes. There are numbers of mosquitoes-too many for comfort-in Cyprus. The common mosquito, breeding in pots, petroleum tins, &c., containing water, is of the genus Culex. Much less common is the Anopheles, in some places apparently unknown, perhaps because not carefully looked for. The first locality in which I found the Anopheles larva was in the neighbourhood of new irrigation works, where malaria had been extremely prevalent, and here the larvæ were found not in the reservoirs, but in small artificial pools of clear water formed by the removal of the soil for use in making embankments. It is satisfactory to know that these pools have now been filled up and these breeding places for

Anopheles done away with. So far I have met with two species of Anopheles—one was evidently Anopheles maculipennis, the other was not recognised.

#### Conclusion.

My hope in submitting these fragmentary notes was to be able to show:-

(1) That there is no disease found in Cyprus, and there only, to which the name "Cyprus fever" might be given.

(2) That the forms of malarial fever met with most commonly in the island are those least fatal.

(3) That febricula, the other fever so frequently

met with, is not dangerous to life. Finally, I would urge that the term "Cyprus fever" be abolished, as its retention, even among medical men practising in the island, can only lead to

## VI.-MALARIAL AND FILARIAL DISEASES IN BARBADOES, WEST INDIES.

By GEO. C. Low, M.A., M.B., C.M.Edin. Craggs Scholar, London School of Tropical Medicine.

THE analogy between malaria and filariasis is in many ways a close and interesting one, both, as far as the tropics are concerned, being very often found coexisting in the same districts, and both being spread from man to man by their own special species of mosquitoes. It is therefore interesting to be able to point to a tropical island, namely, Barbadoes, in which the former is non-existent, while the latter is extremely prevalent amongst all classes of the community. The reason for the presence of the one and the absence of the other is supplied by the fact that Anopheles mosquitoes, the definitive host of the malarial parasite, are not found in the island, whereas Culex fatigans, one of the suitable intermediate hosts of filaria nocturna, abounds.1

Before considering certain local features of those two infections, a brief description of the physical characters of the island may be given with advantage.

# Description of the Island of Barbadoes.

Barbadoes, the most easterly of the Caribbean Islands, lies well in the ocean by itself in latitude 13° 4′ north, and longitude 59° 37′ west, about 100 miles distant from St. Lucia and St. Vincent. It measures 21 miles long by 11 miles broad, and comprises an area of 166 square miles, six-sevenths of which consists of a formation of coral limestone, the remaining one-seventh being formed of different geological strata, namely, the Scotland series, consisting of sandstone and dark clays, and the oceanic series, consisting of white earths and chalks.2 The surface is more or less flat, the land rising gradually towards the centre of the island into two ridges, one of which running east and west, attains a height of 400 feet above sea-level, while the other to the north of this is about 1,000 feet high.

The population of the island numbers 200,000,

British Medical Journal, June 1st, 1901.

<sup>2&</sup>quot; The Geology of Barbadoes, "Harrison and Jukes Brown, 1890.

30,000 of those living in Bridgetown, the chief town, and 1,500 in Speightstown, the second town, while the remainder are scattered about in separate huts and hamlets, or in small yillages.

With the exception of one or two springs, which bubble up and find their way into the sea within a few hundred yards of their origin, there are no rivers, the water supply of the town being obtained by boring into the large subterranean reservoirs of water which exist underneath the coral.

Several ponds and larger collections of water are found at different parts of the islands, two such existing at Speightstown and Holetown respectively; three miles south of Bridgetown there is a permanent swamp.

In addition to these there is a creek communicating with the harbour, which runs inland for some distance in the centre of the town, and another swamp at the south of the island. The water in the latter, however, disappears during the dry season. After heavy rains, and during the wet season, various collections of water are found in hollows and other situations chiefly along the coast. The whole island is practically under cultivation, sugar cane being the staple product. Two seasons may be distinguished, a wet and a dry; the former in summer and autumn, the latter in winter and spring. The average rainfall is about 60 to 70 inches a year.

## Malarial Fever.

On arriving in Barbadoes, and talking with the medical men practising in the town and island, all were unanimous in the statement that indigenous malarial fever does not exist in the island. Cases are frequently met with in the General Hospital; all of these come from some of the neighbouring islands where malaria is very common. No one could point to a case which had originated in the island itself.

The interesting question now arises, Are any mosquitoes of the genus *Anopheles* to be found in Barbadoes or not? As may be gathered from what has been already stated, the features of the island do not lend themselves very readily to the production of suitable breeding places for these insects, with the exception of the swamp at Worthing, three miles south of Bridgetown. This swamp is situated at the foot of some elevated ground quite close to the sea, with which it communicates by a canal, the exit, however, being very often blocked up with sand thrown up by the surf. It covers a considerable area of ground, and is divided up into canals and ponds with roads and paths running through it in various directions. The water, especially in the part near the outlet, is slightly brackish, and in parts it is very stagnant, smelling strongly of sulphuretted hydrogen, resulting from the decomposition of vegetable material. It is probably fed by springs of water, rain, and other collections, which percolate from the neighbouring high ground. The surface of the water at many places is covered with algae of various sorts and other forms of aquatic vegetation. On looking at it, it certainly appears to be a spot favourable for the development of Anopheles larvæ, but although larvæ of a species of Culex and those of dragon-flies and other aquatic insects were always found in abundance, no Anopheles larvæ could be discovered. Confirmatory evidence of this was found in the fact that the people living in the vicinity never suffered from fever, but enjoyed remarkably good health. It is probable, from the close similarity of this place to Anopheles-infested swamps in the other and neighbouring islands, that such larvæ could live here perfectly well; whether they have ever been here and have died out, or whether they have never existed is a matter of speculation.

An examination of the other swamp at the south end of the island was not very hopeful, as at the time of my visit it had only filled up with water after some heavy rain, and contained practically no algo or other vegetation; no Anopheles larvo were found in it, the only result of my search being a species of Culex in small numbers. The creek in the centre of the town is very dirty and muddy, and is really an arm of the sea fed at its upper end by rain and other waters. Several examinations produced no larvo of any sort, the water being probably too dirty for anything to live in. All the various ponds, springs, and other collections of water, though often having plenty of suitable vegetation in them, gave similar results; in some larvo of Culex were found, in others nothing.

These observations coincide with the researches of Mr. Lefroy, Entomologist to the Imperial Department of Agriculture, who has also made a systematic search for Anopheles larvæ with negative result.

The conclusions reached, therefore, bear out that suggested by the epidemiological fact that there is no malarial fever in the island, and once more go to prove that without mosquitoes of the genus *Anopheles* no malarial fever exists.

# Filarial Diseases.

In marked contrast to the absence of malaria in Barbadoes is the large amount of filarial disease that is present. This is not to be wondered at when one considers the extraordinary abundance of the common domestic mosquito of those parts, Culex fatigans, which acts as an efficient host for the spread of the disease. It is an interesting fact that out of more than 600 blood examinations of people from all parts of the island only filaria nocturna was found, filaria demarquaii, which exists in St. Vincent and St. Lucia, and which I lately found in Dominica, never being met with. Although the town of Bridgetown has now a very good water supply brought in pipes from the centre of the island, where it is pumped up from the subterranean collections of water, yet many tanks exist in the gardens of the large houses for watering purposes, and around the native huts barrels and tubs of water are kept and left standing for considerable periods. In those situations myriads of Culex fatigans breed and multiply, and may eventually act as propagators of the disease. An examination of the night blood of 600 cases, taken irrespectively of the patients suffering from disease or not, from the General Hospital, Central Almshouse, and from private sources, will show to what extent filariasis prevails in Barbadoes.

Race.	2	Number Examined.		Non- Infected.		Infected.
Negroes		 401		359	 	44
Mulatto	8	 160		142	 	18
Whites		 39		28	 	14
				-		-
	Total	 600		529	 	76
Y -		= 12.66	per	cent.		

The proportion of fourteen infected whites out of thirty-nine is manifestly much too high. Many of those whites, for one reason or another, were collected in the almshouse at the time of examination, others being more or less selected private cases. The table shows, probably correctly, the proportion of the coloured population affected. The figures referring to white people make clear a point on which sufficient emphasis has not been laid before, namely, that the white person is quite susceptible to filarial disease. This is specially so as regards Barbadoes, where persons, whether resident in the island all their lives, or only visiting it temporarily, often contract the disease; the rich and poor are alike in this respect.

In analysing the table, 27, or 4.5 per cent., had definite pathological changes indicative of filarial disease such as elephantiasis, chyluria, filarial lymphangitis, &c., whereas 49, or 8.1 per cent., had no symptoms whatever, the diagnosis being come to by the presence of the embryos in their blood. This latter class is a dangerous one as regards the spread of the disease; for it is manifest that unless sleeping under mosquito nets, which if they are negroes they never do, they nightly infect many mosquitoes, which in turn infect other people and so spread the disease.

in turn infect other people and so spread the disease. To get some idea of the number of infected mosquitoes about, a series of dissections of 100 mosquitoes of the species Culex fatigans, taken from the wards and corridors of the General Hospital, in which there were cases with embryos circulating in their blood, was carried out. Of this number 25 per cent. were found to be infected with filaria nocturna at various stages of development, and in one mature forms were found in the proboscis, thus showing the danger of being near infected people.

The question arises, What can be done for the prevention of filarial disease? Much has now been done and tried for the destruction of Anopheles, the malaria-bearing mosquito. Similar or modified methods should be carried out for all domestic mosquitoes. Considering that their breeding places are confined to houses and their vicinity, this should not be a task at all approaching in magnitude to the draining large swamps or to treating them in other ways. Taking Barbadoes as an example, as has already been stated, there is now a perfect water supply, and people can get this fresh from the stand-pipes at their doors. Such being the case, old wells ought to be filled up, no water barrels or tubs should be allowed, or if kept, they should be emptied every week or so. and collections of water in gardens should all be periodically treated with kerosene, or have closelyfitting covers to prevent mosquitoes getting in. These methods are all simple and inexpensive, and each householder should see that they are applied in his garden and grounds. The difficulty begins when one has to take into account the inability of the negro to grasp anything of a hygienic nature. The only way to get over this would be a system of sanitary inspection by a few competent men. For individual prophylaxis mosquito nets ought always to be used, but even many educated people still persist in sleeping without them; of course nothing in this line can be expected of the native population.

If such means were adopted for Barbadoes, the prevalence of filarial disease, which is at present quite alarming, could easily, with little trouble and expense, be greatly diminished, thus saving much suffering, as well as loss of time, hideous deformity and, doubtless, in not a few instances, loss of life.

(To be continued.)

## Current Miterature.

#### MALTA FEVER.

This disease, endemic on the island of Malta, has until recently been supposed to be restricted within very narrow limits, but Captain and Assistant Surgeon Joseph J. Curry, U.S.A., has observed a number of cases in the Philippine Islands, and he agrees with various medical officers of the British army in the conviction that it is a widespread affection in tropical regions. From what he suggests in an article published in the new Journal of Medical Research, vol. i., No. 1, it may be that it occurs in our southern States. Since his return from the Philippines Dr. Curry has observed eight cases in the United States Army and Navy Hospital in Hot Springs, Arkansas. Five of them were in men who had returned from the Philippines, one was that of a hospital steward who had become infected in Cuba, one was in a sailor from a man-of-war that had been cruising along the coasts of South America and Central America, and one was in a sailor from a vessel stationed in West Indian

Possibly the vexed question of "typho-malarial" fever may be solved if Dr. Curry's suggestion is carried out. In our southern States, he remarks, there are instances of fever that are neither typically typhoid nor typically malarial, and he thinks it possible that many of them may be examples of Malta fever. He recommends that the sedimentation test with the Micrococcus melitensis be added to the list of routine blood examinations, and he thinks that it will be especially valuable and interesting to apply it in cases of persistent recurring rheumatism. In all the cases observed by him in Hot Springs the previous diagnosis had been that of rheumatism, and, indeed, in view of the prominence of the articular symptoms, this is not to be wondered at. The serum reaction in this disease has been found to occur earlier in this disease and to be more decided than the Widal reaction in typhoid fever.

These studies of Dr. Curry's convey once again the lesson that tropical diseases should be investigated more systematically than has hitherto been the case in this country, and that tropical medicine should be taught in our schools. Most of the work, naturally, will in all probability fall upon the medical corps of the army, the navy, and the Marine Hospital Service, but the results of their labours will be of great utility in civil life, particularly in the mercantile marine.—

New York Med. Journal, September 7th, 1901.

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THE

## Journal of Tropical Medicine

NOVEMBER 1, 1901.

OFTHE THIRD OPENING WINTER SESSION OF THE LONDON SCHOOL OF TROPICAL MEDICINE.

LORD BRASSEY presided at the opening of the Third Winter Session of the London School of Tropical Medicine, and delivered the inaugural address. Additional interest was lent to the proceedings by the presence at the meeting, and the approaching departure, of the Hon. Sir Francis Lovell, C.M.G., for his journey round the world to collect funds to be devoted to the continuation and expansion of the London School of Tropical Medicine.

Mr. Perceval A. Nairne, Chairman of the Committee of Management of the Seaman's Hospital Society, opened the proceedings by announcing the objects of the meeting.

The Right Hon. LORD BRASSEY, K.C.B., in addressing the meeting said: "I have no qualifi-

cation for addressing you on the present occasion excepting this, that I am deeply interested, as all of us in this room are, in the welfare of the Seamen's Hospital Society, an institution of the greatest value. I have been one of its supporters for many years. This meeting has been called for the purpose of opening the third winter session of the London School of Tropical Medicine, and for making known its objects and aims, and to raise further funds to enable it to effectually carry on its work in connection with the treatment of tropical diseases. Now, the salient facts which I have to put before you are these: The London School of Tropical Medicine was established on the initiative of Mr. Chamberlain in the year 1899, when he presided at a banquet, at which a sum of no less than £16,000 was raised for the purpose of giving a suitable equipment to the School, and for the purpose of building wards for the reception of cases of tropical disease. Of this large sum of £16,000, £3,500 was contributed by the Colonial and Foreign Offices, and £1,000 by the India Office, and the balance by merchants and others interested in our Tropical Colonies.

"The London School of Tropical Medicine was originally intended for the instruction of Surgeons in the Colonial and Indian Service, but the work has not been limited to those classes. students, missionaries, and doctors in the employ of trading corporations have been allowed to attend and avail themselves of the instruction and advantages which the London School of Tropical Medicine affords. In the first place the School was intended for a limited number—for twelve students only. It was believed that this number would be sufficient. Experience, however, has shown that the demand for instruction is much greater than had been originally anticipated in this particular branch of study, and I may inform you that in the seven Sessions which have been held since the opening of the School, the numbers attending have averaged twenty-five, and during the last Session it was found necessary to refuse several students for want of room; further, some four or five students have been compelled to postpone their attendance until the forthcoming Session in January next.

"In view of these facts it is obviously necessary that, if the work of the School is to be carried on efficiently, further funds should be forthcoming. Those funds would be appropriated to the enlargement of the School, and to the endowment of the chairs of teachers; and they are required in order to place the entire institution on that sound financial basis which is so desirable in the case of an institution which is rendering such essential and valuable public service.

"Gentlemen, I have to ask the public for a large contribution, if the whole of the benevolent design, which we are anxious to carry forward, is to be undertaken with success. I have to ask for a sum of no less than £100,000, and I think I am justified in saying that, large as that sum is, it is yet a small sum for this great Empire, having so large an area within the tropics. It is, after all, not a large sum to ask for in order to improve the hygienic and sanitary surroundings of our fellow subjects in tropical climes. I hope at this meeting we shall make some beginning in raising that substantial sum."

Dr. Patrick Manson, F.R.S., C.M.G., said: "I desire to say a few words about the two functions which the London School of Tropical Medicine wishes to fulfil. These are related to each other, yet they are distinct. One is the education of the practitioner who proposes to devote his life to medical practice in the tropics, and the other is the attempt to advance medical science as regards tropical disease. As regards the educational part of the work, I can claim that we have had a distinct success, although we commenced our work with a certain amount of trepidation and anxiety as to the probability of the public countenancing it. Indeed, our work was initiated under considerable difficulty, financially, and considerable difficulty in the way of professional opposition. Both of these, happily, we have succeeded in overcoming -the first, as Lord Brassey has explained, mainly through the assistance and countenance of Mr. Chamberlain, and also through the liberal and enlightened generosity of the Managers of the Seamen's Hospital Society. We want, however, our laboratories very much enlarged-at least doubled. The accommodation now is simply ridiculous—absolutely inadequate—and must be doubled if the School work is to go on.

"Then, in addition to our laboratory, we want a lecture-room and accommodation for a museum. No teaching institution of this sort can adequately fulfil its functions unless the lectures and demonstrations can be illustrated by specimens. Then, in addition, we want a good library and an increase of the collegiate accommodation. present we have six rooms in which students live. These six rooms are always filled, and we have always applications for many more. The advantage to the student of living on the premises is very great indeed. It economises his time for one thing, and it gives him an opportunity of studying diseases whose active manifestations occur perhaps at any moment, and even during the night.

"Another important aspect of this collegiate question lies in this, that around the mess table some two dozen, or perhaps three dozen, medical men from all parts of the world congregate; they exchange ideas with each other, and at the end of the session, what at the beginning of the session may have been a new idea confined to one or two men has become familiar to all. Each man picks, so to speak, the brains of all the other men. There is a sort of accumulation of experience, and a man at the end of the session goes away probably with the knowledge and experience of two dozen men. This social life is of enormous value and importance.

"One other aspect of the subject I might speak about. It is extremely desirable that on so important a matter as tropical disease, there should be some sort of centre to which men requiring information on the subject can apply. The London School of Tropical Medicine did not contemplate this at the onset, but gradually it has been forced upon us. Questions referring to tropical disease are being constantly brought to the London School of Tropical Medicine, and not only that, but Mercantile Companies and a variety of institutions whose operations are being conducted in foreign countries apply to us to give them information on the special subjects they are

interested in, and also to supply them with medical men. That is an important development which we did bot foresee, and which I readily apprehend will, in the near future, be still more extensively employed.

"At present we have only one resident teacher, Dr. Daniels. He is a splendid teacher, and in addition to extensive knowledge of his subject, and exceptionally large experience, he has personal qualities which endear him to his pupils and his non-resident colleagues. But one man is not enough. Suppose he falls sick—the whole machinery of the school is brought to a standstill. He ought to have at least one assistant to help him, and, if necessary, to take his place when necessary. Such men have to be paid, and well Their whole time is given up to their tutorial and research work, and the remuneration should be in proportion to the importance of their office and the time and energy expended. We should be able to offer such salaries as will ensure our being able to keep a good man when we get him. We lost an excellent man when we lost Dr. Rees, Dr. Daniels' predecessor. could offer him no career adequate to his deserts. If we lose Dr. Daniels I do not know where we could find a third.

"At the outset of this scheme a great many men came forward, both in medical papers and elsewhere, with the statement that this so-called education in tropical disease was altogether superfluous. They said that the education was supplied by the ordinary medical centres. Now, men who make statements of that sort are either unacquainted with the subject of tropical disease, or have assigned to the ordinary Medical School an amount of knowledge and teaching capacity, in foreign things, which they really cannot and do not possess.

"Another subject about which we feel very acutely in the London School of Tropical Medicine is the difficulty with which we have to contend in our attempts to forward the advancement of tropical medicine as a science. We have done a little—without boasting I might say a good deal—in the recent advance in the study of malaria. The London School has borne no insignificant

part in that. It certainly has contributed its quota to this, one of the most important advances in the science of medicine.

"Some time ago, when Professor Koch was here, I had the opportunity of talking to him on the subject of the expeditions that are being sent out by Germany, England, and other countries, for the investigation of tropical disease. I was rather astonished at the niggardly position that English medical science, in this respect, occupied in comparison with Germany-all the more astonished when I recollected that Germany is a mere child in Colonial enterprise to England, and has an insignificant stake in Colonial work compared with our country. Nevertheless, the Germans spend five times as much money on this subject as we do. I asked Dr. Koch to give me a detailed statement of the expenditure that the German Government was incurring on account of the investigation of tropical diseases, and he very kindly drew it out. This I shall read, and I hope the Press will take particular care to make a note of Dr. Koch's letter.

"'In answer to your request, I am sending you a list of the present medical expeditions which are being sent out under the auspices of the German Government, namely: (1) Professor Frosch in Brioni (Istria); (2) Staff-doctor Bludau in Lussinpiccolo (Istria); (3) Staff-doctor Vagedes in German South-West Africa; (4) Staff-doctor Dempwolff in New Guinea; (5) Staff-doctor Ollwig in German East Africa; (6) Dr. Krulle in the Marshall Islands. Further expeditions to Togo and Kameruns are being planned. The expeditions 1 to 5 have for their collective object, in the first place, the investigation of malaria, and form regular continuations of any malaria expeditions made to Italy, Dutch India, and New Guinea. Expedition No. 6 has for its object the investigation of syphilis and its different forms in the South Sea Island groups. The European expeditions 1 and 2 receive 20 marks (£1) daily allowance, besides compensation for the various travelling expenses, outlay for the laboratory, &c. The "outside Europe" (foreign) expeditions receive 40 marks (£2) daily, besides compensation for travelling expenses and outlay for scientific objects (books, instruments, complete laboratory arrangements, their upkeep, &c.), with a further 1,000 marks (£50) for personal equipment.'

"Now, were England to subsidise the study of tropical medicine to a proportionate extent, instead of two or three ill-paid, almost insignificant expeditions, we would have 100, and each man well paid. As it is, those men who work for the School go out for a mere pittance—hardly a living wage—so small that I would be ashamed to mention the amount. In contrast to this you find the German Government sending out to different parts of Europe men who are paid £1, and to foreign countries men who are paid £2, a day, besides expenses. In contrast to this I dare not mention the insignificant sums we offer men who go abroad for us."

The Hon. SIR FRANCIS LOVELL, C.M.G.: "I think I had better briefly explain the circumstances under which I have agreed to undertake this work on behalf of the London School of Tropical Medicine. It is now over thirty years since I first went abroad. It was in October. 1869, that I travelled the East as far as Alexandria in the P. and O. steamer "Delta," and I had fortunately, as a fellow passenger, his Lordship who has just vacated the chair. That is not the only occasion on which I had the pleasure of meeting Lord Brassey. I have met him and received kindness from him on board his yacht "Sunbeam" and elsewhere abroad. I consider, therefore it is a happy coincidence that I am again about to proceed on another voyage, and a considerably longer voyage than I have taken before, under somewhat similar auspices, namely, the auspices of Lord Brassey, and I trust that the same good fortune which has hitherto attended me in my foreign service, may be extended to me in my present undertaking in connection with the London School of Tropical Medicine.

"On my return from abroad a few months ago, in April last, when I had concluded nearly thirty years' service under the Colonial Office, I went to that Office and stated that I thought the time had arrived when I might retire on what I considered a well-merited pension. With the universal kindness that I have always met with

from all those gentlemen who are connected with the Colonial Office, it was suggested to me that I might perhaps like to undertake some work so as to avoid my finding myself idle, which I did not care for, and it was thought I might perhaps come to some arrangement with the Seamen's Hospital Society, to undertake a mission in order to provide funds to enable that Society to put the London School of Tropical Medicine on a more satisfactory basis than at present exists as regards funds. That proposal brought me into contact with my friend, Dr. Manson, whom it had been my privilege to know for some years past. I paid several visits with him to the London School of Tropical Medicine at the Albert Docks. I saw the admirable work that has been attained there and is being carried on under the able administration of Dr. Manson and his colleagues, and realised how absolutely necessary it is to extend those premises if the aims and objects of the School are to be achieved.

"It was pointed out to me, and I saw the reasonableness of the argument, that in order to enable the School to carry out the objects for which it was instituted, it was absolutely necessary that funds should be forthcoming. public had contributed very generously on one occasion already, and it was agreed by the Committee of Management of the Society, that an appeal should be made to wealthy residents abroad. I thereupon made an offer to the Seamen's Hospital Society to proceed abroad to endeavour to get the influential and wealthy residents in the East and other tropical parts to contribute towards the object which the London School of Tropical Medicine has in view. That offer was submitted to the Seamen's Hospital Society. I had the pleasure of an interview with the Chairman and Board of Management, and after considering the question in all its bearings they decided to accept my offer.

"It was decided that I should proceed in the first place to India, Burmah and Ceylon, thence on to the Straits Settlements, China and Japan, New Zealand and Australia, probably returning by way of the United States and Canada. I do not think anyone will consider that the sphere of my labours

is a restricted one. However, it is my intention to do the best I can to raise funds to enable the Seamen's Hospital Society to put the London School on such a footing as will render it worthy of its name as a medical teaching body in this great City of London."

## A MEDICAL AND SURGICAL EMERGENCY CABINET.

Devised for the Use of Indian and Colonial Surgeons.

By Major H. E Drake-Brockman, F.R.C.S.E., &c.

Indian Medical Service.

A FAIRLY considerable experience of medical work in the tropics has shown me that medical practitioners, either private or servants of Government, are often, owing to their extreme isolation and residence at long distances from any hospital or medical institution whence the necessary instruments, &c., could be borrowed for the time being, greatly handicapped in the efficient performance of their professional work for want of some compact, yet, at the same time, thoroughly well-equipped cabinet containing all the instruments and appliances necessary for medical and surgical diagnosis, as well as those necessary to meet any emergency at a moment's notice.

With the object of placing such within the reach of any medical practitioner so situated, and rendering him independent of his surroundings whatever and wherever these may be, I have, after much deliberation, constructed a cabinet to meet this great want, a brief description of which may not perhaps be here

out of place.

The cabinet as constructed consists of two portions, each of the dimensions 26 in. (length) by 18 in. (breadth) by 10½ in. (width), being similar in size and shape, and so made that they can fit into an outer wooden case with handles suitable for travelling if necessary, and can be so constructed, if desired, as to be capable of being slung on to the back of a mule, or other pack animal, in the same way as field medical panniers (military). These cabinets when taken out of their outer travelling cases are handsome little pieces of furniture, provided with lock and key, and which, when placed together, form a suitable and welcome addition to the furniture of the consulting room. The cabinets themselves are made of polished mahogany (can be made of teak if preferred), are supplied with brass handles, and of a size which can be easily moved about and handled by one person like a small trunk. Each cabinet is provided with drawers, all of which are stocked with the necessary instruments and appliances in such a way that they can be got hold of at once, as the latter have been arranged with some system, all being allotted to the several drawers in relation to their use, and arranged together accordingly; for instance, all the instruments relating to uterine diagnosis, &c., will be found in one drawer. The drugs, to which there is a full drawer allotted, are all in tabloid form and consist only of those which are likely to be required on emergency in the tropics, as well as some of the usual antiseptic solutions in soloid form. In this drawer is also to be found a small partition containing the latest pattern of hypodermic sterilisable syringe, together with all the mostly required drugs for injection in tabloid form, and also a few phials of antitoxins, such as antidiphtheritic, antivenene for snake bite, &c., &c. The syringe, it will be noted, I have had graduated to both minims and c.c. in order to be available for use with both tabloids as well as antitoxins.

All the instruments supplied have been chosen after a deal of forethought and with a view to portability compatible with efficiency; for instance, a Kramer's ear speculum has been included, which will answer very well also for the purpose of a nasal speculum, being dilatable to any size, thereby doing away with the necessity for having the two instruments where one will answer both purposes. Certain instruments, such as midwifery forceps, ophthalmoscope, &c., regarding which there is usually a large difference of opinion amongst medical practitioners, can be supplied, according to the individual taste, by the makers; those selected by me are, what I fancy, mostly used by the majority, such as Barnes-Simpson forceps and Jessop's ophthalmoscope, the latter an excellent little instrument, which has the double advantage of being very compact and portable as well as most efficient, a matter of some importance where space is necessarily limited. All the instruments selected are of the metal handle aseptic pattern, in order to facilitate sterilisation.

The greatest care has been taken by me to insure the provision of all the latest and most modern pattern of every available instrument which it has been found necessary to include in the list; still, as above mentioned, these are capable of alteration and modification to suit the individual taste of any practitioner should he have any particular fancy in this respect to satisfy.

The cabinet has been constructed under my direction by the well-known firm of Messrs. Burgoyne, Burbidges and Co., of London, to whom my thanks are due for the way in which they have carried out all details, and on application to whom all particulars regarding cost, &c., which is very moderate considering its completeness, may be ascertained.

## Acws and Notes.

PRESENTATION TO DR. PATRICK MANSON, C.M.G., F.R.S., LL.D.—The President of the British Medical Association presented Dr. Manson, at Cheltenham, with the Stewart prize, which consisted of an illuminated scroll and a cheque for £50 (250 dollars). This prize is given for the encouragement of the study of epidemic diseases.

MR. FREDERICK PEARSE, F.R.C.S.Eng., M.R.C.P. Lond., D.P.H.Camb., has been appointed Acting Health Officer for Calcutta during the absence on leave of Dr. Nield Cook.

### Correspondence.

#### INSECT BITE.

To the Editor of the JOURNAL OF TROPICAL MEDICINE.

Dear Sir,—I beg to forward you an insect which I shall be glad if you will kindly get identified. It inflicts a very nasty sting, which is done by a huge proboscis capable of being folded up beneath the maxilla and neck. Acute pain and inflammation follow in a few minutes. In one case the whole leg became swollen.

Singapore.

Yours, &c.,

LIM BOON KENG, M.B., C.M.EDIN.

## IDENTIFICATION OF THE INSECT REFERRED TO BY DR. LIM BOON KENG.

To the Editor of The Journal of Tropical Medicine.

DEAR SIR,—The insect you send from Singapore is one of the Hemiptera-heteroptera known as *Conorhinus rubro*fasciatus, De Geer. It is neotropical and oriental in distribution. Yours, &c.,

FRED. V. THEOBALD.

British Museum (Natural History).

## Current Miterature.

#### BERI-BERI.

Dr. W. E. Scriven, Assistant Surgeon at the Prison and Pauper and Quarantine Hospitals at Penang, in an interesting letter addressed to the Editor of the *Indian Medical Record* (September 18th, 1901), records the result of the application of blistering fluid to the cardiac region in the treatment of wet beri-beri. Dr. Scriven, who adopted this form of treatment from October 10th to December 31st, 1900, in thirty-two cases, expresses himself as follows:—

"No other medicines were given, not even the much-extolled pineapple, and from notes carefully kept, it was observed that the swelling disappeared on an average of nine days. Amongst these, seven ended fatally from diarrhœa, leaving eleven remaining with no ædema whatever, but only with the usual symptoms as seen in the dry form of this disease; the others were discharged as cured. It may be added that in several instances the blister had to be repeated as often as four times, and where the fluid failed to take from the tough state of the skin."

The following table gives the results of the treatment:—

Average Average Remaining Average stay of those who stay of those Total Dis-Died treated charged discharged died remaining 32 14 36 days 50 days 49 days

#### BERI-BERI AND WHITE LEPROSY.

By Albert S. Ashmead, M.D., New York.

Dr. F. W. Cox, of Vermilion, South Dakota, in his article, "The Subject of Tropical Disease," November number of the *Medical Herald*, speaks of Philippian

beri-beri as being "an endemic disease, and, undoubtedly due to infectious micro-organism." That is a question of opinion. Neither Dr. Takaki nor the Dutch East Indian doctors believe this. It is endemic, if you choose to call it so, only in the rainy season, and a thousand beri-beri specialists believe that it is not due to a micro-organism.

I, myself, believe that it is due to poisoning by carbonic acid gases, in crowded quarters of prisons, &c., from (Japanese) charcoal stoves, and the general lack of ventilation in the rainy season. As soon as the north-west monsoon begins to blow (beri-beri is provalent only when the southern monsoons are blowing), beri-beri disappears. Absolutely, in Japan, there is not one case again until the next rainy season. That a micro-organism has nothing to do with the disease is proved by a case reported by Miura, of Japan, occurring on the top of Fujiyama, 12,600 feet above sea-level, in the month of December, that of a scientist, who was closely shut up in a cabin, moored to rocks, to keep it from blowing away, and with all crevices in its walls calked up to prevent his freezing to death: his sole dependence for heat being his little Japanese charcoal stove. As it was, his fingers were badly frozen, and he contracted beri-beri. Now, if a germ could foster itself at that altitude, in north wind blowing, cold December (patients sent to the slightest altitude in the rainy season quickly recover), why should it not develop at sea-level in the same month in Japan? It never does. Dr. Cox's statement that the paralysis present in beri-beri is accounted for by the alterations found in the spinal cord, as well as pressure by "effusion on its surface" is disputed by most beri-beri pathologists, who claim that it is due to peripheral neurites, most prominently the pneumogastrics and tibials. Their conclusion that it is not of central origin is corroborated by the frequent occurrence of circumscribed ædemas along the special vaso-motor nerves. Moreover, beri-beri was not epidemic, that is, did not occur in many people, in the rainy season, at one time in Japan, until the use of charcoal as a fuel became popular, that is, in 1590. In 1740, two Japanese doctors, Kagawa and Noro Gendji described it as a new disease, yet it had been in China for centuries before this time.

One word more, as to leprosy, and what Dr. Cox says of the disappearance of pigments in anæsthetic lepers, "so that the skin becomes perfectly white." Here we have what is just showing itself, in the descendants of Scandinavian lepers, in our American North-west, an abortive type of leprosy. One finds this also in Japan, in Brazil, &c. The important question is whether the disease can, after reaching this stage of radical disappearance, regenerate itself. I believe that it can. Even the "white leper" of France, Zamboco Pacba thinks, is capable, under renewed conditions, of once more inoculating Europe.—From the Medical Herald, February, 1901.

#### DIARRHŒA.

A NEW METHOD OF MAKING TANNIN AVAILABLE AS AN INTESTINAL ASTRINGENT.—Albert C. Barnes and H. Hille have found that by the synthesis of nucleinic acid and albumin there results an entirely new body,

Treatment.

which chemical analysis shows belongs to the nucleoproteid class of bodies. Under certain conditions this body enters into chemical combination with tannin and forms a yellowish-brown tasteless powder containing 50 per cent. of tannic acid. This substance is insoluble, does not precipitate albumin, pepsin, or peptones. Experiment has proved that 75 per cent. of the tannin nucleo-proteid passes through the pylorus chemically unchanged, and it must be, therefore, practically free from astringent action upon the stomach. It has also been shown that this tannin nucleo-proteid but very gradually evolves tannin from its combination. Thus, as the remedy passes downward through the intestines, the astringent is brought into contact with the entire intestinal canal. The astringent action of tannin is more complete when but small quantities come in contact with any one part of the intestinal mucous membrane, while larger quantities produce local irritation. This new remedy should be successful in the treatment of diarrhoea and of various diseases of the intestines associated with diarrhœa.—Philadelphia Medical Journal, July 20th,

#### DYSENTERY.

R	Magnesii sulphatis	 	5i.
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	Quininæ sulphatis	 	gr. i.
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	Aquæ menth. pip	 	gr. 388.
$\mathbf{M}$	Sig.: This dose a. 3 h.		- 0

#### PLAGUE.

PLAGUE appeared in Liverpool in the Everton district during the last week of September, 1901. Up to October 31st six persons died of the disease. Plague re-appeared in Glasgow on October 29th, 1901, three cases being reported up to October 31st.

WAR ON RATS IN JAPAN.—The health authorities in Tokio, in their efforts to suppress the plague, have offered a bounty for the killing of rats in the infected district, with the result that over 200,000 of the rodents were destroyed in the course of two weeks in June. As an additional measure, infected buildings covering nearly half an acre were burned.

#### EXCHANGES.

Annali di Medicina Navale. Archiv für Schiffs u. Tropen Hygiene. Archives de Medicine Navale. Archives Russes de Pathologie, de Médec., Clinique et de Bacteriologie. Australasian Medical Gazette. Boletin de Medicina Naval. Boston Medical and Surgical Journal. Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology. British Medical Journal. Brooklyn Medical Journal. Caducée. Climate. Clinical Journal.

Clinical Review. Giornale Medico del R. Esercito. Hong Kong Telegraph. Il Policlinico. Indian Engineering. Indian Medical Gazette. Indian Medical Record. Janus. Journal of Balneology and Climatology. Journal of Laryngology and Otology. Journal of the American Medical Association. La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal. Medical Brief. Medical Missionary Journal. Medical Record. Medical Review. Merck's Archives. New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyclinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo. Sei-i-Kwai Medical Journal. The Hospital.

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### Original Communications.

ON SOME UNDESCRIBED HÆMATOZOA OF MALARIA IN THE MALAY PENINSULA, AND ON BLOOD-PLATES AS HÆMATOBLASTS.

The First Part of this article, with plate, will be found in the Journal of Tropical Medicine, Sept. 16th, 1901.

By W. LEONARD BRADDON, F.R.C.S. State Surgeon, Negri Sembilan.

PART II.—ON BLOOD PLATES AS HÆMATOBLASTS.

THE changes which accompany formation of the red discs from their earliest antecedents to their most mature forms, so far as they are to be observed in the circulating blood, are, as might be expected, exhibited in a greater degree than ordinary when disease or accident entails in that fluid more rapid processes of regeneration or repair. It may well be supposed that in malaria, pre-emmently a disease of the blood itself, in the course of which the erythrocytes are destroyed in enormous numbers, the process through which regeneration is effected should be more abundantly manifest. Accordingly, the study of the blood, especially in living films stained with the fluid which I have described, is rewarded by surprising revelations. It is to some of these, readily to be seen in almost every case, in the blood at least of recovering malarials, that I shall draw attention in this paper. As the observations deal with the blood-plates and their relations to the other formed elements, it may be as well to give a rėsumė, first, of the little that is known about them.

Hayem 1 then, who claims to have been the first to have accurately described them (and who, in particular, used the method of spreading out the blood in capillary films for observation) says of the blood-plates, as observed in fresh blood, that "they are very minute

Du Sang, p. 82, et seq.

corpuscles resembling at first little red globules of extreme delicacy and paleness. Hardly have they been perceived than they have already altered; they become thorny, stick to the glass, wrinkle, and grow paler, while some of their substance disappears; they have a tendency to cohere with corpuscles which they encounter so as to form a heap. . . . or they remain discrete, or form strings or bunches. . . . Almost immediately they become profoundly changed and nearly unrecognisable." 2 Studied under conditions designed to fix them, Hayem described the plates as being distributed throughout the film separately or in small groups rarely exceeding five plates in number. "They are remarkably sharp, very delicate and pale. Some are slightly discoid, others (a good many) are sub-globular, round or elongated, having a sort of stalk of different lengths, or borders which are indented" (p. 86).

Seen thus intact, without any re-agent, the hæmato-blasts—Hayem so designating the blood-plates—" are perfectly homogeneous and smooth of surface, their appearance is colloid, or slightly glassy; and sometimes they are sensibly tinted yellowish or green. The smallest, which are colourless, are without granulations, bearing no resemblance to any part of white cells. . . . their diameter is about  $3 \mu$ . . . ." (loc. cit.).

"The exact shape of the element is difficult to determine. In fresh or circulating blood the hæmato-blasts are flattened or sub-globular; in preparations made with fixing fluids, especially with osmic acid, they seem to be bi-concave, like the red corpuscles. However, when examined dry they refract light as do convex bodies. This peculiarity alone will be enough to enable the smallest red corpuscles to be distinguished from 'hæmatoblasts.'"

He goes on to prove by the manner of reflection of images from their surface that the platelets are

<sup>&</sup>lt;sup>2</sup> Loc. cit., p. 85. <sup>3</sup> Loc. cit., p. 93.

certainly convex in surfaces (a property as to which in our staining fluid any observer may readily satisfy himself). The same properties are exhibited by the very small red corpuscles of the goat, however, Hayem points out, and says that such optical properties under the conditions are no proof that the plates are really globular, as opposed to the hollowed out red corpuscles. In the fresh blood, even when examined in a film carefully sealed from the air, the plates change more rapidly than any other element. They proceed to dissolution after the blood has been drawn but a very short time. Examined a little later Hayem notes that the plates are "irregular, angular, and that in this condition they present two portions, more or less sharply distinguished, a peripheral finely granular, another central, corpuscular, of vitreous appearance, and considerable refractility. Their first alteration is shown, then, in a kind of retraction which makes them more shining and brighter, and by the exudation around them of a special matter.'

"The substance which thus comes so rapidly out of the 'hæmatoblasts' is extremely viscid, and this property well explains the formation of the little heaps. At the very beginning the 'hæmatoblasts' join together in the form of little angular grains or small stars composing often a sort of chaplet, every grain of which is distinct; then the small plates appear to be drawn together strongly, the sticky substance which surrounds them going to form a common mass, in which its constituent elements are overlaid and confounded."1

From such an agglomeration, as from discrete plates wherever scattered throughout the plasma, run out the fibrinous threads which are precursors of coagulation.

Hayen was unable to demonstrate any formed structure in the plates. In the largest ones, met with in anæmias, he recognised a certain "coarse granulation, with a bright centre, somewhat eccentric but close to the middle. This granulation is sometimes to be seen also in the smallest and most delicate plates, and is exactly analogous to what we have noted in the red corpuscles. As it has the appearance of a nucleolus the indication was to determine the presence of nucleus in the plates. variously staining these elements, fixed in different ways one may be convinced that they contain no nucleus analogous to that of the nucleated red discs. In this respect again they resemble the non-nucleated red corpuscles.'

Hayem goes on to demonstrate the occurrence in the blood of forms intermediate between the platelets and the mature red corpuscles. He finds them chiefly in what he calls dwarf forms (globules nains) which possess physical properties intermediate between the two. Under this name he includes all the small coloured discs under 6 µ.

Between them and the plates on the one hand, and the largest giant forms on the other, every size is, in different conditions of the blood, to be met with.

Hayem, therefore, concludes that the plate is an "element in evolution. . . . At first minute, delicate, colourless, extremely vulnerable, it grows, acquires traces of hæmoglobin, becomes more refractile, and more resistent to the process of coagulation; then arrives a time at which its chemical constitution is altered more completely still, and at which its hæmoglobin colouring is equal or nearly so to that of the red disc. Becoming a 'dwarf' disc it then loses the physiological properties which characterised it, to acquire those of the red corpuscles.'

An extending study of corresponding forms in animals having nucleated red discs, confirmed Hayem in these views of the rôle of the blood-flakes in human blood. In such animals the flakes, like the mature discs, are also nucleated, and between them and the adult forms every stage is normally to be met with.

Upon such grounds Hayem felt justified in appropriating for the plates the designation of hamatoblast.

To the observations made by Hayem nothing of importance, so far as I can discover, has since been added. Ehrlich finds that, like the plasma, and the protoplasm of the white corpuscles, they are strongly alkaline, as shown by the iodine-eosine method—in this respect differing from the red corpuscles. According to the same author they also contain glycogen. "The blood platelets," Ehrlich and Lazarus say, on the grounds of their small size and complete lack of nuclear substance, are generally regarded as not analogous to real cells. Whether they represent intravital precipitation of substance, as of the plasma, or whether they are budded off from the cells, cannot at the present be decided with certainty, though many facts seem to support the latter assumption. That they contain glycogen marks them as descendants of the blood cells. Moreover, appearances are often met with in dry preparations that arouse suspicion that the platelets arise from the red blood corpuscles (Koeppe). Arnold has further observed processes of budding in the red blood corpuscles not only extravascularly but intravascularly, in the mesentery of young guinea pigs, and has seen the elements that were cut off change into forms free from hæmoglobin.4 Cabot's says of the blood-plates, "unless their number is increased by some pathological influence, we seldom notice them at all in normal blood. . . . The blood-plates are irregularly shaped, very cohesive elements, about one half the diameter of a blood disc, usually seen clinging together in masses like zoogloca. They are colourless and not amœboid and look like débris." He estimates their frequency normally as 400,000 to 700,000. He says that they are stained easily with eosin, and they are usually considerably increased in processes of blood regeneration.

Foster's summary adds nothing new, but emphasises the origin of the red corpuscles from nucleated precursors, formed chiefly in the bone marrow.

These bodies, the average sized among which are termed normoblasts, being of about the same dimensions as the average red corpuscle, arising chiefly in the bone marrow, are formed there by the division of similar cells.

Loc. cit., pp. 94, 95.

<sup>&</sup>lt;sup>2</sup> Loc. cit., p. 99.

<sup>3 &</sup>quot;Histology of the Blood," p. 46.

<sup>4</sup> Loc. cit., p. 192.
5 "Clinical Examination of the Blood," p. 53.

<sup>6 &</sup>quot;Physiology," p. 48.

In the normal blood their occurrence is rare, but they are a constant constitutent of it in leukæmia; and after severe hæmorrhages and other conditions stimulating regeneration, may appear in it in overwhelming numbers. Smaller nucleated forms (microblasts) and extremely large ones (megaloblasts) are also found in the blood, but only in diseased conditions. The nucleus of these erythroblasts disappearing, whether by absorption, or extrusion, all the cell-body which remains functions as an ordinary red corpuscle. By this process and by it only, Ehrlich and others claim, are the red corpuscles of the blood ordinarily brought into being.

Milroy, in an article on the physiology of blood,1 states that the plates are shown by their staining and other properties to be "nuclear or nucleoid," and that they are believed to arise from the nuclei of the

leucocytes.

I do not propose here to examine in extenso these opposing theories, but such a sketch of them was necessary for a proper appreciation of the observations which I am about to detail. And first one or two a priori considerations may be submitted as emphasising that aspect of the matter to which I believe the conclusions which I shall have to offer afford support.

One of them is the enormous number of the red corpuscles themselves which have to be supplied, from whatever source they arrive. In the normal process of their decay, even, it seems probable, and there is evidence in the excretions to support the view, that myriads—a myriad is 10,000—may require to be replenished daily. Through trauma, or disease, destruction of hundreds of millions of these bodies occur, and is made good by others formed within a space measured by only a few days. It seems incredible that in the limited bulk of the marrow of all the bones together sufficient regenerative cells can exist to bring about this replenishment.

Again, as Ehrlich and Lazarus point out," "it must always be borne in mind that, in normal blood, the individual red blood corpuscles are by no means of the same value. Step by step some of the cells are used up and replaced by new. Every drop of blood contains, side by side, the most various stages of life of fully formed crythrocytes." This being so, it might surely be expected that the normoblast should be as frequently in evidence as any of the other forms.

It has not been shown, nor is it likely to be claimed that, in health, the more or less permanent marrowcells, by the division of which erythroblasts are formed, exhibit—being, as it may be supposed, mature -such extraordinary differences in size as actually do the red corpuscles. There should, therefore, be an average stage in the evolution from unhamoglobinised nucleated cell to fully hæmoglobinised denucleated disc, which should be met with more frequently than other stages. In other words, the free circulating form should (as having been produced by normal and average processes) enter the blood from its station of origin always of a common size, which would naturally be the smallest therein met with. But discs of

Except in feetal blood nucleated discs of any kind, indeed, are so uncommon, that it is hard to credit the theory that everyone of the billions of red corpuscles

has each at one time been such a cell.

Again, if as may be supposed in health, the output of discs is fairly regular, and their natural liability to decay equally so at every stage, it is manifest that the youngest forms in the series must predominate in number over all the others, except the fully grown discs, the proportion of which latter will depend on the average duration of their life after, as compared with the period before, attaining maturity. unless it be the blood-plates, there are to be observed in the blood discs of no other stage of growth sufficiently numerous nearly to satisfy this condition. On the other hand there are the blood-plates, consequently present in numbers, which normally (400,000 to 700,000) would appear to be sufficient to supply all normal losses and regenerative demands, and for the presence of which no other function has ever been even suggested, and between which and the mature corpuscles Hayem first noted and others may demonstrate every grade of evolution.

I regret that want of extended leisure has prevented my own work from being more ordered and systematic.

The facts which I shall detail have been drawn, however, from numerous and careful, and often prolonged observations of the blood of individuals of every age and condition, and are easy to be repeated by any observer. The conclusions to be drawn from them support and even extend the theory of Hayem.

As to technique, my observations have generally been made upon blood drawn in a capillary film between cover-slip and slide, sealed by vaseline from the air. Dilution, when practised, was effected with a 1 or 2 per cent. solution of potass. cit., or a similar solution with  $\frac{1}{2}$  to 2 per cent. of methylene blue added. The first observation to be made then is that whenever examined the blood of all individuals contains larger numbers of red discs below than of those which have attained to a size of 7.5 µ which may be taken as the mature standard. Especially in solutions diluted with the stronger methylene blue stain, the presence of discs of every dimension is to be observed (as Ehrlich admits), and of every degree of hæmoglobinisation. Hæmoglobin is driven out from the corpuscles by the solution, and the more readily the younger and smaller the discs, or the less strongly coloured they appear to be. The form of the

the smallest size-necessarily as frequent as those of any other particular dimension (except the fully developed) as they must be, if all the cells are growing equally-exceed by far the average numbers of the normoblasts which indeed are, except in infancy and diseased conditions, found rarely in the blood. And although the youngest forms of the blood discs, they are already no longer nucleated when they enter the stream. It is very surprising, therefore, to find that when normoblasts are in evidence in the circulation, their size (as accorded to them by nearly all observers) is that of an ordinary fully formed red corpuscle. It is conceded on all hands that the microblast is evidence merely of disease; in any case its extreme rarity precludes any assumption that it may be the usual precursor of the disc.

Encyclopædia Medica (edited by Watson). Edinburgh: W. Green & Sons, 1899.

Loc. cit., p. 49.

stroma is, however, perfectly preserved, corpuscles so treated retaining a clear and perfect contour, usually for two or three days; some of them often for five or six.

This renders obvious, what previous methods have failed so well to show, that the relative number of smaller discs greatly preponderates; and (as it seems to me) this preponderance inversely with size increases all the way down to the smallest formed elements, namely, the blood-plates. As compared with any other particular size which can be measured in a field, the plates (containing together all those under say  $2\frac{1}{2}$   $\mu$ ) are always and by far the more numerous. In conditions of blood-regeneration, as after malarial attacks, this excess of the smaller over the larger elements is very striking. In specimens from such cases the plates are so numerous as greatly to exceed all the other forms together.

It is to be observed that their extreme delicacy (thinness) and pallor (lack of hæmoglobin) render it almost impossible to detect many of the younger discs in ordinary fresh blood, and that nearly all the fixing and staining processes result in destroying them. In blood spread out in thin films and dried rapidly, the contour of young discs, like that of the blood-plates, becomes wrinkled, and the shapeless masses which represent them are often indistinguishable from aggregations of the latter, and from the lumps and masses of "protoplasm" which observers conveniently label as debris.

(2) Regarding the appearance of the plates as seen in fresh blood, there is nothing to add to the observation of Hayem.

The addition of my solution reveals more striking

pictures.

Blood-plates as then seen in the blood, undisturbed except by dilution with a staining fluid which does not destroy them and into which the blood immediately flows from the finger, occur either discretely or in groups of few or many-I have counted fifty in such a group. They rapidly absorb some of the blue and appear as delicate clearly separate bodies of a finely granular (blue) substance (cyano-plasm), upon or in a still more delicately transparent and more brightly refractile matter. Within ten minutes afterwards the stain is deeper, and the separation between the two substances perfectly distinct. The cyanoplasm-chromatin, perhaps true karyo-plasm-is more or less spherical in shape and exhibits deeper central (nucleolar?) staining; the other matter appears as a clear, unstained, sharply-contoured refractile disc. There then takes place a gradual separation between the colourless disc and the small mass of spherical cyano-plasm. The actual movement in process is not sensible to the eye, but in the result the separation may proceed until a slender connection only exists between the two bodies (see Plate III., fig. 14). At first coloured, this connecting thread later becomes colourless. Finally, complete separation occurs, no doubt between all such bodies, but I have actually observed it only in some of the larger forms.

The still associated discs and spheres are bodies of singular beauty and clearness.

The connecting thread of cyano-plasm, usually straight, may be curved, but in any case appears to

have some degree of rigidity, for the coupled bodies may be observed when drawn or driven to and fro by currents between groups of corpuscles, to retain perfectly and without bending, their shape and relative positions. The adhesiveness of blood-plates to foreign matter has been abundantly noted. The addition of the pot. cit. and m.b. solution seems to diminish this property of theirs. It may be observed that the statement so commonly made that the plates "run together" when the blood is shed, owing to this quality of adhesiveness, involves some misconception. The true interpretation of such groups, I shall suggest later, is quite different, and involves a very important argument relating to their origin. I find, in fact, that the distribution of the plates more discretely or in clusters depends but little on mode of manipulation. Let several specimens be taken from different individuals, or from the same person at different times, and subjected to the same procedure, and it will be found that nevertheless the groupings of the plates are totally different.

The stickiness which is assigned as the cause of aggregation of the plates is, in fact, an argument against it, when, for instance, the blood is drawn, in a natural manner, by capillary attraction into the smooth space between two glasses; since, not being possessed of that independent mobility by which alone they should be enabled, as it is phrased, "to run together," they more likely and actually do adhere to the first foreign surface with which they are

brought into contact.

It is at least as probable a priori that such groups are the original formation, and that discrete plates occur through their scattering, and this I hold to be a proper interpretation of their distribution. So far, then, the characters of the plates as revealed by the solution are those of exceedingly minute formed cells, and the interesting process which has been described resembles that of "nuclear extrusion," claimed by some as the normal fate of the nucleus in normoblasts; although Cabot holds this-the original view of Ehrlich—to have been disproved. Under artificial conditions the occurrence of such extrusions is undoubted. The happening of a similar process therefore in the blood-plates supports the contention that the extruded matter, which I have referred to only as cyano-plasm, is really nuclear in nature too.

(3) Beside the blood-plates there are to be observed in all bloods (but again most abundantly in the post febrile regeneration of malarials) forms which present a complete and unbroken series between them and fully formed discs (Plate III., figs. 5 and 6). In all particulars these bodies otherwise resemble the plates. The same separation between spherical cyano-plasm and discoid stroma occurs with them. When the "plate portions" of the larger among them have become detached they are to be distinguished from a mature disc in nothing except their tenuity and lack of hæmoglobin.

As regards these particulars, and that of size, the remarks already made show that a complete series of gradations in forms acknowledged as red corpuscles, also occurs. The contention of Hayem, that in the blood takes place, and in it exist examples of

every stage in the evolution of the red disc from the platelet, the true "hæmatoblast," is therefore amply supported by observations which he who wills may confirm. But so complete and clear a demonstration of the process in the "hæmatoblasts" themselves was not obtained by Hayem for want of a suitable medium.

(4) A yet more remarkable, and I believe previously wholly undescribed phenomenon is to be observed in similar preparations of blood, under certain conditions, which I have met with so far only in cases of regeneration in malarials after the paroxysm. It is the formation from leucocytes of flattened discoid processes or plates which ultimately become separated, forming bodies indistinguishable from red discs, in anything except their size and the absence of hæmoglobin. Ehrlich, it is true, mentions a formation of free "plasma elements" by budding, especially from large lymphocytes. But these "buds" would appear to be spherical The plate processes now described (Plate III., figs. 9 to 20) appear to be differentiated from the cyano-plasm of either lymphocytes, or (and chiefly) from the neutrophil polymorphonuclear leucocytes, the nucleus and nucleolus remaining sharply distinguished and taking no part in the proceeding.

The plates vary in size from  $3\mu$  or  $4\mu$  up to  $10\mu$ ,  $15\mu$ , or even  $20\mu$ , but the average dimension is nearer to that of the ordinary red corpuscles. There appears in many leucocytes a tendency to the formation of as many plates as the nucleus itself, often fully divided, shows divisions. Where a single plate is formed from a single mass of cyano-plasm, which becomes in the process separated from it, the whole proceeding again exactly resembles "nuclear extrusion"; but in many cases the volume of nucleus (cyano-plasm) extruded greatly exceeds the clear (supposed) cell body remaining (cf. forms figs. 13 and 14). In other instances, several plates become separated out from a single smaller mass of cyano-plasm which itself remains undivided (Fig. 16).

In their optical characters these plates resemble the minute blood-plates; appearing as smooth homogeneous refractile discs of perfectly flat surface and perfect circular, seldom ovoid contour. Detached in the plasma they are not distinguishable from the discs of the hæmatoblastic series already described.

The process of formation is slow, the actual motion of separation not being perceived by the eye. Fully formed and separate processes are met with only after the blood has been under observation for some hours. The process appears to continue until necrobiotic changes supervene in the fluid. It is to be remarked that the movements of malarial parasites, the streaming of their pigment, the movements of amœboid leucocytes, and the vivacious agitation of the granules in eosinophil forms, continue unabated in these preparations for many hours, and continue often long after the process of plate differentiation has begun, facts which must greatly weaken any argument which may be raised that the process described is wholly or in part either factitious or necrobiotic.

But those are points for which I am not now concerned. At present I claim only, that these observations show, that under certain conditions of stimulus or environment, free structureless discs, closely re-

sembling in their shape the red corpuscles, are formed from the protoplasm of leucocytes. Such a function suggests a hitherto entirely unsuspected relationship between the white and the red corpuscles.

(5) Ehrlich claims, and so far as the demonstration of a continuous series of gradations between the one and the other can establish it, seems to have proved a relationship of evolution between the large monuclear lymphocytes and the p.m.n. leucocytes.

It is not hard to imagine that all the white cells, if not genetically related, should have certain functions in common. I have mentioned that my "plate processes" are formed from both p.m.n. cells and lymphocytes.

The constant tendency to division of the nucleus which characterises this group of leucocytes has not yet been explained, actual division of the whole cell in the blood having seldom been observed. Nevertheless it must be supposed that the division of the nucleus, as it certainly is purposive, is probably also

progressive. In examples of blood in which most of the white cells seen are amœboid, as frequently happens before the onset of a malarial paroxysm, gradations occur between p.m.n. forms, having many well defined, clearly stained nuclei, and others in which the karyoplasm appears to be almost uniformly diffused through the whole of the protoplasm, and to be evidenced only by the deeper staining of parts of the latter. Other masses of cyano-plasm yet occur (under conditions to which I cannot give precise definition) which, while resembling the more diffuse of the last forms described, yet appear hardly to present characteristics by which they could be classed as single cells. Between these again and a closely packed aggregation or heap of blood-plates, there is no distinction which is obvious, either optical, or in reaction to stains, save only that in some such cases the mass is resolved into separate elements (blood-plates), but in others it is not. Here then is suggested a mode of origin of the blood-plates which, if entirely novel, has at least some plausibility.

In this view the evolution of the large lymphocytes with one nucleus into the pm.n. cell with many nuclei: the further sub-division or diffusion of the latter in numerous small points throughout the protoplasm, the breaking up of such a mass into the largest possible number of smallest karyo-plasmic centres, at or from which the smallest formed elements of the blood, the plates arise; the occurrence of such plates in groups and masses, which are only evidence of their community of origin; the subsequent separation of the plane disc or plate of stroma, from its cyanoplasm (if not the gradual absorption of the latter within the former); the isolation of such disc-bodies, their growth, and the elaboration by them of hæmoglobin from the plasma, and their final maturation into red blood corpuscles-from a conception of the relationship of the principal elements of the blood, which is at least complete and harmonious.

One of the phenomena which Hayem found difficult to interpret, was the fact that while examined in *fluid* the blood-plate, so soon as its clearer and more refractile portion became distinguishable, appeared to be bi-concave, and was surrounded by a sort of halo

of unformed granular matter, but when examined in a rapidly dried film the same bodies appeared to be actually larger in size and bi-convex. It seems evident that in one case, the cyano-plasm is caused to be extruded in a formless condition by the injurious action of the medium, while the cell-body-as I may now call it-becomes flattened, more refractile, and of smaller size. On the other hand, the whole body, when rapidly dried, nearly retains its proper bulk, and some degree of convexity due to the presence within it of the not yet extruded cyano-plasm.

Finally, as opposing the theory of blood genesis-held by Ehrlich and his followers and supporting that of Hayem, which they have, it seems to me, somewhat contemptuously endeavoured to dismiss, reference may be made to one or two further considerations.

The myelogenous theory of blood formation is that every blood cell has arisen within the bone-marrow and from a nucleated precursor. The presence of such forms in the blood occurs only when and is a sign that the hæmapotysis is in excess of the normal. It were to be expected, therefore, that when normoblasts appear to be more frequent in the blood (as in various anæmias and leukæmia, especially myelogenic leukæmia) the red discs should be in greater numbers also. The reverse is of course the case.

There is no explanation of, and there appear to be no anatomical arrangements for, the influx into the bloodstream of the erythroblasts as their seat of origin, while especially in pernicious anæmia the nucleated hæmoglobin bearing marrow cells exhibit the greatest diversity of shape and dimension, some being as large as 50 µ, there is no corresponding variation in the blood discs lying in close contiguity to, and presumed to have been formed from them. The increased marrow metaplasia which is relied upon as proof of its normal blood-forming function is more evident in chronic disorders, of which destruction without proper regeneration of the blood-discs is the main feature, than in processes in which (as after severe simple hæmorrhages, or pure blood diseases like malaria) regeneration is both immediate and extensive. Indeed, the increased myelogenic activity may equally well be regarded as an exacerbation of a disease of which it is a part, equally as a sign of repair. The nucleated red discs of the marrow are no doubt In infancy, under unwonted stresses of injury or disease, they may be conceived as attempting to function vicariously as true blood corpuscles; normoblast in the marrow, abnormoblast in the blood.

The function of the leucocytes as formers under unusual stimuli of free disc-shaped elements, closely resembling blood corpuscles though without hæmoglobin, and as the prime source of the blood-plates, from which ultimately the red corpuscles developed, will, if confined, also afford, what has been lacking hitherto, a satisfactory explanation of the physiological leucocytes of infancy, of pregnancy, and perhaps even of digestion, as well as of the enormous output of the polymerously nucleated cells after severe hæmorrhages and other forms of blood destruction.

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#### THE LIFE CYCLE OF THE AMCEBA DYSENTERICAL

By F. GOLDSMITH, M.B., Ch.B. Government Medical Officer, Northern Territory, Australia.

In a certain type of tropical dysentery a microscopical examination of the mucus from a stool will show the presence of an amœba (the amœba dysenterica).

The amœba, when full grown, is several times the diameter of a red corpuscle, when quiescent it is more or less round in shape, and when in active movement becomes elongated, and may be described as irregularly oval; it consists of an ectosarc which is welldefined and clear, and an endosarc which is transparent and colourless, or has a very faint greenish tinge; it contains a nucleus (with one or more nucleoli) granules, vacuoles and greenish bodies that have been described as "red corpuseles which appear to have undergone digestive liquefaction" (Muir and Ritchie).

The amœba moves by protruding rounded pseudopodia of clear ectosarc sometimes to the extent of one fourth of its own diameter or more, then there is a rush of the contents of the endosarc towards and into the clear protruded part, and the whole of the after-part of the amœba gathers up in the direction of the protrusion, locomotion to the extent of the protruded part is accomplished, and the process is repeated.

With an ameeba in full activity a fair amount of ground is covered in a short time. The direction of the movement varies with individual amœbæ; one will pursue a definite direction requiring constant shifting of the field for its observance; another will move in an irregular circular direction, keeping within a limited area; while another will content itself with protruding and retracting its ectosare without much altering its position in the field.

Besides amœbæ, the other elements usually seen in dysenteric stools are :-

(1) Mucus or lymph cells. These are generally seen in masses with intervals of clear space between, and with patches of comparatively clear spaces scattered through the substance of cell masses in which the cells are absent or thinly spread.

(2) Red blood corpuseles singly or in rouleaux These are most frequently seen in the intervals between the clumps of cells, they are unaltered in appearance, and in malarial patients the characteristic parasite can be observed in their substance.

Cf. Muir, Journal Anat. Phys., vol. if., No. 3, p 365.

(3) Bacteria of various kinds.

(4) Greenish bodies similar to those seen in the substance of the amœba itself. These are usually seen singly embedded among the mucus cells or near the edges of the cell masses. They differ from red corpuscles in many ways: (a) They are usually seen singly and never in rouleaux; (b) though about the same size as the red corpuscle they vary in size more than the red corpusele does; (c) they differ in shape more than a red corpusele does, the latter may of course vary in shape if subject to pressure, but in the examination of fresh stool no pressure should be used, so their shape is usually normal, while the greenish bodies may take many shapes; (d) their colour is different, being distinctly green with no tinge of red; (e) their capsule is more distinct, and often a faint suggestion of a nucleus may be seen; (f) a side view shows a flat or bi-convex shape instead of the bi-concave shape of the red corpuscle; (g) the locality in which they are found in the field is different, being most frequent within or at the edges of the cell masses, while the red corpuscle is nearly always found in the clear spaces between the masses; (h) they are observed from among the cells and in the substance of the amœba in the discharge from tropical abscess of the liver where red corpuscles are not in evidence; (i) they appear to possess slight amœboid movements in themselves, which of course the red corpuscle does not.

These facts all tend to show that the greenish bodies seen in the endosarc of the amœba are not red corpuscles that have undergone digestive liquefaction, but are entirely different bodies, and from my own observations, I think there is no doubt that they are embryonic amœbæ, and it is by their means that the

germs of dysentery are disseminated.

Regarding them as embryonic amoebæ the question arises, are they altogether the product of the amoeba? or are they red corpuseles that have been taken up by the amoeba, the germ of reproduction planted into their substance and then discharged again? For my part, I regard them altogether as the product of the amoeba on the following grounds:—

(1) Though prolonged watching of an amceba containing these greenish bodies showed me that one or two of these bodies were occasionally discharged, in no case have I seen a red corpuscle actually taken up

into the substance of the parasite.

(2) The greenish bodies are present in the amcebe and discharge of tropical liver abscess for days after operation, while red corpuscles are few in number or not in evidence.

I base my opinion that they are real embryonic amoebe partly from evidence and partly from deduction.

The evidence is the result of observation. By careful watching of one of these bodies some steps in their development may occasionally be seen. The body (preferably one near the edge of a cell mass) is sometimes seen to possess in itself a sort of amorbic movement; the movement itself can rarely be seen, but repeated observations of the same body at intervals occasionally shows that a change in shape has taken place, the body, from being round, has become oval, pyriform, kidney-shaped, and p rhaps becomes round

again. If it then starts to develop it enlarges, and at the same time begins to lose its distinctive green colour, its nucleus becomes more apparent, and by the time it is the size of a lymph cell it is almost indistinguishable from the surrounding cells; it enlarges still more, granules, and later on vacules, appear, and when about twice the diameter of a lymph cell the characteristic amœboid movements start, but till then it remains rounded in shape, and it is not till it is full grown that the greenish corpuscular bodies commence

to appear in its substance.

The evidence of deduction is based upon the fact that at present there is no satisfactory theory as to the method of dissemination of the amœba by which disease may be spread. Taking it for granted that the amœba is the pathological cause of this type of dysentery, and without entering upon the question whether or not the amœba can be evolved de novo, it is undoubted that the disease is most frequently spread by means of the drinking water which in some way has become contaminated with fæcal or dysenteric All observers agree that after twenty-four stools. hours of being passed the amœba as such disappears from the stools and cannot be found by microscopic examination; this is my own experience too, but I find that the greenish bodies do not disappear, but persist, practically speaking, for all time. As it is very seldom that dysenteric infection in this way gains entrance into the body in such a short space of time. it is obvious that the amœba, as such, is not the cause of the disease, but that it is due to the entrance into the body of some more resistant germ that has the power under favourable conditions of developing into the amœba itself, and though it is impossible to observe this process within the body, it is extremely probable that the greenish body has the power of remaining latent for an indefinite period, and under circumstances favourable to its growth and development (such as a lesion in the mucous membrane lining the intestine) can develop into the amœba, and by reproduction of its species bring on an attack of dysentery.

It would not be inappropriate here to give a short résumé of the epidemic of amœboid dysentery which lately attacked the district surrounding Port Darwin, with a view of emphasising my remarks in relation to

the latent period of the amœboid germ.

Port Darwin is situated on the north coast of Australia, and is well within the boundaries of the tropies; the town is placed upon a peninsula, perhaps half a mile broad, with good natural drainage, the soil being mostly ironstone, with a direct fall into the harbour on either side. The water supply is derived from two sources, viz., rain water collected from the roofs of houses and stored in tanks, and from wells. I may here state that the epidemic was most marked among those that used tank water. The seasons are two, a wet and a dry, and the water collected in the wet season and stored in the tanks has to last through the dry season, till the next rainfall, probably five or six months. The epidemic broke out very soon after the first rains, when the dust and filth collected on the roofs during the dry season, were washed into the tanks.

Cause of the outbreak .- The population of Port Dar-

win, roughly speaking, comprises 2,000 people, of whom perhaps two-thirds use closets with buckets, which are emptied three times a week; the remaining population consisting of aborigines and the lower classes of Asiatics (Chinese, Malays, Philipinos, &c.), defæcate indiscriminately upon the ground on any vacant land near or in the town. These motions soon dry in the sun, mingle with the dust and with it are blown about in the air, and some, of course, deposited on the roofs of houses.

The simultaneous outbreak of dysentery in several parts of the town, following almost immediately the first rainfall after a particularly long dry season, seems to point to a common cause for the disease, and this theory, in my opinion, is most probably the correct one, especially when in the earlier stages of the epidemic the disease was almost exclusively confined to those who derived their drinking supply from the tanks. If this theory is correct it points to the presence of some germ capable of producing the amceba, but which has much greater latent and resisting power to time than has the amceba itself.

In the greenish bodies spoken of above we find a probable solution of the question; they are always present when the amœba is, and are of greater resisting power than the amœba, as they can be seen hours or days after all traces of the amœba have disappeared.

In this article I am only dealing with the cause of the onset of the epidemic, and not to its dissemination when the disease has gained a footing; when other causes come into play, one of the most common modes of the spread of the disease when once established is the ordinary house-fly, as mentioned by Sir William McGregor, in the *Brit. Med. Jour.*, October 6th, 1900. The stools are swarmed with this pest, and there is no doubt that they are the active agents in conveying the germs to the milk or other articles of food within their reach.

I would also like to mention the presence of crystals occasionally in the stools, more especially of patients in whom a large surface of bowel is attacked. These crystals, bearing a striking resemblance to the phosphatic crystals often seen in urine, occurred in two fatal cases shortly before death, and in one case after it became chronic, and in none of these cases where the crystals appeared was I able to find any live amœba. This might open up the question as to whether it is not Nature's own effort to effect a cure, and whether treatment by phosphates might not be advantageous. I do not intend here to go into the question of treatment, but suffice to say that where the disease did not appear to extend beyond the sigmoid flexure I found (in conjunction with medicinal treatment) injections of methylene blue, grs. x., sol. acid borici (saturated) Oii., followed by almost instant relief, and by an absence of live amœba in the stools for twelve hours, and two injections generally sufficed to effect a cure.

I regret exceedingly that no pathological laboratory was within my reach that would have enabled me to make experiments with regard to the cultivation of the amceba. I think a broth of the large intestine or liver of the cat (which seems to be susceptible to its action) would probably show that cultivation is possible.

A STUDY OF LEPROSY IN THE INDO-CHINESE PENINSULA AND YUNNAN. By Dr. E. Jeanselme.

Review by Dr. OSWALD BAKER, Lt.-Col., I.M.S. (retd.), London. DR. E. JEANSELME'S brochure, entitled "A Study of Leprosy in the Indo-Chinese Peninsula and Yunnan," is the outcome of a mission, with which he was entrusted, in 1898, by the Minister of Public Instruction and the Colonial Minister, having for its object the submission of a report on the best means of dealing with leprosy in the French colonies in the east. With this object in view Dr. Jeanselme proceeded to the Indo-Chinese peninsula, that vast extent of country bounded by Yunnan on the north, by the China Sea on the east, by the Bay of Bengal on the west, and whose southernmost extremity is Singapore, an enormous tongue of territory, in which almost all the eastern possessions of the French nation are situated. He visited the important centres of population in Cochin China, Tonkin, Annam and Cambodia. From Hanoi, in Tonkin, he travelled through Yunnan to Bhamo, and thence descended the Irrawaddy river until he arrived at Rangoon. From the latter town he went by sea to Penang and Singapore, and finally

regained Cochin China, completing a circular journey

which extended the entire length and breadth of the peninsula. He spent a year and a half in pursuit of

the task he had taken in hand. Dr. Jeanselme has embodied the results of his labours in a small book, published by Messrs. Carré and Naud, of Paris, under the title given above, which it is to be hoped the authorities responsible for the administration of the French colonies have taken into their serious consideration, and which, moreover, should be read by every one interested in leprosy. The subject matter of the volume has been conveniently arranged into three chapters, of which the first and second are of considerable interest. The first chapter is devoted to a consideration of the degree of prevalence of leprosy throughout the Indo-Chinese peninsula and Yunnan; while in the second, which is headed "The Struggle with Leprosy in the British Colonies," the author writes, in a practical manner, of the various Leper Acts which have been brought into operation in many of the territorial possessions of the British Empire, and he presents his readers with a useful collection of the cardinal sections of these legislative enactments. The final chapter of the

Chapter I. Dr. Jeanselme points out that Indo-China is largely inhabited by agricultural races which congregate on those fertile areas that are to be found in the valleys and deltas of the principal rivers in the peninsula. In these situations he found leprosy universally prevalent, the degree of prevalence being in strict geometrical ratio to the density of the population. In Cochin China alone the official returns gave a total of 3,580 lepers. In Annam there were

book consists chiefly of the measures proposed by

himself for the control of leprosy in the provinces of

the peninsula belonging to France, which are nearly all based on the fundamental proposition that leprosy

is communicated exclusively by contagion. In the

interests of British colonial medical officers it seems

advisable to give a full epitome of the contents of the

numerous lepers, especially at Hué and in the villages near the sea-board, but leprosy was not found on the high hinterland of Annam owing, according to the author, to the infrequent communication between it

and the low-lying endemic areas.

In Tonkin leprosy is even more common than in Annam. It was found that whereas under native rule lepers were confined within definite boundaries, since the French annexation many of these inhabitants had left their leper settlements and were dwelling among healthy people. An encampment of 150 lepers was seen, however, not far from Phuc Nhiac, in the province of Ninh Binh, and one in Hanoi itself, with 200 lepers who had, however, living with them an equal number of healthy people.

In Cambodia and the Laos country, where the population is scanty, leprosy everywhere exists, but only to a slight extent, and there are no leper villages. The people, however, fear contagion and never touch a leper: they banish lepers who have ulcerations to the jungle, or to a sand-bank in the middle of the river, or

to a raft moored close to the shore.

Small local epidemics of recent origin were here and there met with. In the village of Ban-Hat-Sao, with about sixty inhabitants, leprosy was unknown until twenty years previously, when it appeared in a Chinaman born in the village, but whose father was a native of Southern China. Three years later another native Chinaman, whose father was also born in China, manifested the disease. The first Chinaman married a Lastian widow and communicated leprosy to her and to her son by a former husband, and this Chinaman also communicated the disease to his niece. With regard to this and similar outbreaks Dr. Jeanselme remarks: "The study of these epidemics is very interesting, for it affords certain proof of the relationship of cases, and enables one to witness the prominent rôle of contagion in the formation of leprosy centres." The author is forced to the conclusion that there is no denying the important part played by Chinamen in the dissemination of leprosy.

With regard to the French possessions in Indo-China, it is estimated that the number of lepers is no fewer than from 12,000 to 15,000, and as the population is set down at 20,000,000, the proportion of lepers to healthy individuals is as 1 to 1,500. As far as Cochin China alone is concerned, there is one leper to every

300 or 400 inhabitants.

In Bangkok, the capital of Siam, with a population of from 500,000 to 600,000, there are at least 1,000 lepers.

In Yunnan the population is sparse and scattered, and although the disease is spread all over the country, no definite groups of lepers were met with. In Yunnansee, the capital, there were several lepers among the 800 cripples sheltered in the Imperial Asylum.

With regard to Burmah, it is said that the immense and fertile valley of the Irrawaddy is a vast centre of endemic leprosy. At Mandalay there are at least 500 to 600 free lepers in addition to 250 confined in the two leper asylums of that town. At Prome the steps leading to the large Pagoda are covered by lepers, who exhibit their ulcers and beg for alms. Lower Burmah swarms with lepers mutilated by the disease, of whom only about 60 are isolated in the Rangoon asylum.

In the Straits Settlements leprosy has become so formidable that the people are calling out for the compulsory isolation of all lepers. Two asylums are already in existence there, one for Malays and the other for immigrant Chinese.

In summing up the general prevalence of leprosy in the Indo-Chinese peninsula, Dr. Jeanselme writes

as follows :--

"There are no precise data on which the number of lepers inhabiting the Indo-Chinese peninsula can be estimated with any approach to accuracy. In putting, however, the total number of cases at 25,000 I am certain of understating the facts.

"Although most of these unfortunates belong to the French possessions, we have hitherto taken no serious measures to minimise the effects of contagion. The number of lepers cared for in the different charitable institutions of our colonies is really insignificant, and the leper villages which existed in Tonkin before the

annexation render no real service.

"The English administration, on the other hand, has made praiseworthy efforts. It subsidises in Burmah leper asylums, in Mandalay and Rangoon, worthy of the name, and at Jerajak, near Penang in the Straits Settlements, it supports an island settlement for lepers which enforces the strictest isolation."

Chapter II. In this chapter which, as already stated, is entitled "The struggle with leprosy in the British Colonies," Dr. Jeanselme, after again drawing attention to the fact that leprosy is a contagious disease, and after pointing out that this circumstance must influence all the regulations that are enforced with a view to the prophylaxis of the malady, proceeds

as follows:-

"The English who, equally with the Romans, possess in the highest measure the gift of ruling conquered nations, have long since taken important steps to control endemic leprosy, which desolates their vast colonial empire. The numerous laws which have been imposed on their subjects during the last fifteen years show the energy they have displayed in struggling with this scourge. In thus acting they have been influenced as much by considerations of political economy as by motives of

philanthropy.

"Each human life represents capital. Now every leper becomes sooner or later not only unproductive but a charge on the community; moreover, the reputation for unhealthiness which is acquired by countries desolated by leprosy diverts commercial enterprise and imperils the future of the colony. All these losses added together amount to millions of money. Although these ideas are self-evident, and very simple, it is by no means useless to enunciate them. The medical man too often neglects to consider the economic side of sanitary measures, and when he asks Government to make great pecuniary sacrifices, it is his duty to point out the pecuniary profit which the authorities are entitled to expect if they adopt the measures proposed.

"The English, being intelligent observers, are careful not to impose uniform and symmetrical legislation in all their colonial possessions. They have everywhere and in all respects observed the principles of autonomy, only interfering to an extent necessary to

safeguard their authority and protect their material interests. This principle of the least possible intervention, which has decentralisation for its corollary, has been applied by them to the solution of the problem of the prophylaxis of leprosy."

Seeing that the French have taken no steps to arrest the spread of leprosy in their own colonies, it is not surprising that Dr. Jeanselme should consider the action of the British Government deserving. But, bearing in mind the fact that no attempts were make in the British colonies to legislate for the suppression of leprosy until fifteen years ago, whereas these territories, with their endemic centres of leprosy, have formed part of the British empire for many generations, it cannot reasonably be maintained that the attitude of the authorities concerned, in respect of the prophylaxis of leprosy has been characterised by energy. Nor is it probable that the action of Government in legislating for lepers has its origin either in motives of political economy or of philanthropy. It is rather due to the pressure of public opinion supported by a growing belief in the contagiousness of the malady.

In the consideration of the various Acts relating to lepers which have been introduced in several of our colonies, Dr. Jeanselme has, in consequence of the diversity of race and climate which these widely-separated territories present, arranged them into four sets.

(a) The first applies to the Australian colonies and the Mediterranean possessions of Cyprus and Malta, where the white race increases by multiplication as well as immigration. The chief of this series are Act 1890 of New South Wales, and Act 1892 of Queensland. These two Acts are almost identical, and the main provisions of the latter are summarised as follows:—

Section 4.—Whenever there is any reason to believe that any person is suffering from leprosy, the owner or occupier of the house shall immediately report the case in writing to the nearest police magistrate who shall send a report to the Minister, and also forward a copy of the same to the Central Board of Health. Whenever a medical practitioner finds a case of leprosy he is bound to make similar reports. All neglect about this rule is punishable by a fine not to exceed £100.

Section 8.—The Minister shall direct the examination of the suspicious case by one or more medical practitioners, and if the diagnosis of leprosy is confirmed, he shall have the leper sent to an asylum. If the leper declines to obey, or escapes, or attempts to escape, he may be arrested by such police as is necessary, and taken to the asylum.

Section 9.—All persons intentionally disobeying an order, interfering with its execution, entering within the limits of an asylym, communicating with persons detained there, or interfering with them without reason, are punishable with a fine of from £10 to £20.

(b) The second set of Acts relates to the British possessions in South Africa, where Europeans can also live and multiply, but, unlike Australia, where leprosy is already very prevalent.

The subject of the prophylaxis of leprosy in South Africa was considered in all its bearings by a special Commission which met at the Cape in 1894-5. One of the conclusions arrived at was that there are no methods other than complete, or partial isolation by which the progress of leprosy can be effectively stayed, and the Commissioners recommended that the notification of every case of leprosy should, with a view to isolation, be made compulsory. The Commissioners, however, advised that no attempt should be made to deport all lepers to a single asylum far from their homes, such as that on Robben Island, but that isolation should be carried out in private dwellings, in licensed houses, and in leper villages or locations.

The Leper Act of Natal (1890) directs the compulsory isolation of all persons suffering from infectious leprosy, a definition given only to advanced cases of the disease, who may apply for admission into an asylum, or whose cases are brought to the notice of a magistrate. The Act, however, gives magistrates authority to isolate lepers regardless of their disease under the circumstances alluded to in the following sections:—

Section 14.—Whenever it is reported to the Governor that leprosy is prevalent in any locality, he may direct the local magistrate to make any enquiry. Leprosy shall be deemed prevalent whenever more than five persons residing within a circle three miles in circumference are affected by the disease. The district civil surgeon shall make the enquiry and shall submit a report, giving in each case the sex and approximate age.

Section 17.—The Governor after taking cognisance of the conclusions of the report may direct the persons affected to be sent to a leper location.

Section 18.—The magistrate shall deliver to every adult leper, or guardian of a minor leper, a notice directing the person affected to proceed to a leper location within a month from the date of notice, and remain there until released according to law.

Section 20.—This section enumerates the methods of appeal open to persons who have received an order to proceed to a leper location.

Section 21.—The magistrate may authorise members of the leper's family who wish it to accompany him to the location. He must, however, first satisfy himself that those who wish to accompany the leper are actually related to him.

Hindu or other dark-coloured immigrants suffering from leprosy are prohibited from entering the colony.

(c) The third division of the Leper Acts, in which the essential provisions are for the most part similar, embraces Acts which apply to the West India Islands, British Guiana, and the Straits Settlements. The majority of these Acts contain clauses providing for:—

(1) Compulsory detention of vagrant and pauper

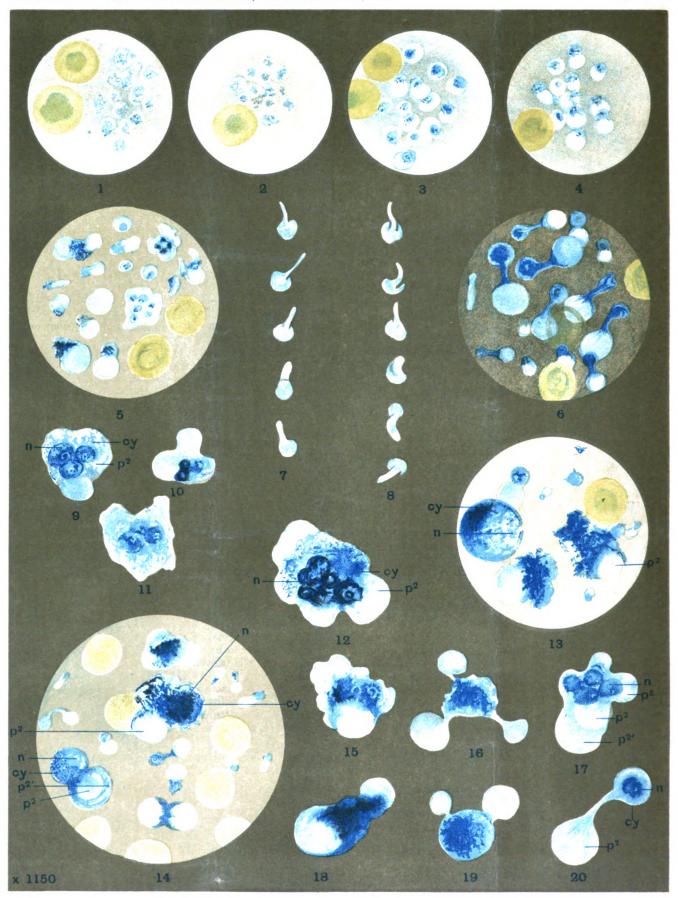
(2) Isolation of pauper lepers at the request of those responsible for them.

(3) Prohibition of lepers to exercise certain trades and occupations.

(4) Prohibition to bring lepers into the colony.

The most comprehensive of these Acts is that which relates to the Straits Settlements, and which is based on the recommendations of the Leprosy Commission





W. L. B. del. July 20, 1901.

Bale and Danielsson, Ltd., London.

# Illustrating Dr. Leonard Braddon's Article on "Some Undescribed Hæmatozoa of Malaria in the Malay Peninsula and on Blood-Plates as Hæmatoblasts."

The First Plate and Article were issued in the "Journal of Tropical Medicine," September 16th, 1901.

#### DESCRIPTION OF PLATE II.

Figs. 1, 2.—Two groups of ordinary blood-plates after 2<sup>1</sup> in methylene-blue and potash cit. solution.

[M. B., May 21st, 4 p.m., no fever.]

[Plates of all sizes very numerous, that figured predominating. Polymorphonuclear leucocytes very few, a few 2 to 4 nucleated, and single nucleated leucocytes present. Plates chiefly found in closely packed groups as depicted.]

Figs 3, 4.—Same groups seen ten minutes to a

quarter of an hour later.

Fig. 5.—Composite field, drawn from actual observations made in one specimen, from a person not affected with fever at the time. Bodies forming every grade between blood-plates and mature discs are observable; the smaller with the nuclear matter from which they arise [or which is extruded from them] still attached; the larger free.

[Every size of plate up to fully formed red discs was observed. Müller's dust abundant, especially about the larger aggregations of platelets. Author's

blood, May 21st, 9 p.m.]

Fig. 6.—Composite field from one specimen. Appearances after staining one quarter of an hour. Extended separation of colourless discs from cyanoplasm ["extension of nuclei"].

Many larger free discs were also found. The

separated cyano-plasm is spherical in form, except in one instance, where it is altered by the stress of adhesion to the slide.

The smallest bodies are platelets, showing a similar process. From a case of malarial fever having mycoid parasites [Ahmat, Malay, aged 27. Temp. 103° F.].

Figs. 7, 8.—Represent two "plates" in which, from alteration of position, the flattened nature of the disc-process, and the more or less spherical form of the

remaining cyano-plasm are apparent. [Author's blood, May 9th.]

Figs. 9, 10, 11, 12.—Polymorphonuclear leucocytes, showing stages of differentiation of plate processes from the cyano-plasm. The nuclei, with nucleoli deeply stained, remain distinct.

[These and the other remaining figures were all taken from one specimen, six hours after the fastigium of an attack of malarial fever. Mrs. G., June 24th.]

Fig. 13.—An actual field, showing several bloodplates from which discs are being differentiated; a lymphocyte of which nuclear part is unstained, and two lymphocytes in which blood-plates are being differentiated from the cyano-plasm.

Fig. 14.—Another actual field, the central figure in this shows how little the plate formation can be regarded as due to a "nuclear extrusion," the nucleus being far larger than the "plate" or "all" remaining.

Near the bottom of the figure the two perfectly clear plates seem to have been formed from a very

small centre of cyano-plasm.

Figs. 15-20.—Various examples of formation of plate-processes from cyano plasm of polymorphonuclear cells, and of lymphocytes. In 16 and 20 such discs have nearly, in 19 two have completely, become separated from the cyano-plasm.

In some of these, the larger processes (Fig. 17, pl. II.), (Fig. 14, pl. II.) absorb some stain, owing possibly to incomplete differentiation. The unstained

processes appear to be most differentiated.

Magnification employed about 1,200 diameters (obj., Reichert,  $\frac{1}{16}$  in., eyepiece, Watson B.); the drawings from which the plate is copied were made in colour freehand, sizes being checked by camera lucida. Owing to the distance of the paper the magnification has become a little exaggerated in the drawing.

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which met at Perak in the year 1893. The chief sections of this legislative measure, which is styled "The Straits Settlement Ordinance of 1899," are as follows:—

Section 6.—Whenever a person is convicted of an offence punishable under Section 32 of the Summary Criminal Jurisdiction Ordinance 1872 (Vagrancy) and the magistrate is satisfied that the person so convicted is a leper, such magistrate may, under his hand and seal, direct the detention of such leper in a leper asylum until he is released by order of the Governor.

Section 7.—When it appears to a magistrate that a person within the limits of his jurisdiction is probably a leper, it shall be lawful for such magistrate on the requisition of any person legally bound to support the alleged leper, to make enquiry into the ease, and if such magistrate is satisfied that the alleged leper is a leper, and he is or will become a burden to the person legally bound to support him, such magistrate may by authority under his hand and seal direct the detention of such leper in a leper asylum until he shall be released by order of the Governor, and the person legally bound to support such leper shall pay Government monthly, during the detention of the leper, such sum for his maintenance as the magistrate shall order after considering all the circumstances of the case.

Section 3.—The Governor-General in Council may by notification in the official gazette prohibit the exercise of certain occupations by lepers, such as

those of :-

Butcher, baker, cook, or any trade or occupation in which the person employed handles articles of food or drink, drugs, medicines, or tobacco under any form whatsoever.

Washerman, tailor, or any trade or occupation in which the person employed manufactures, or handles,

Barber, or all other trades, or similar occupations in which the person employed comes into contact with another person.

Servant, nurse, jinrickshaw coolie, driver licensed

to drive a hired carriage.

Section 4.—Any leper who enters a hired carriage, jinrickshaw, or other public vehicle, or who lodges in a boarding house or a lodging house, or who bathes in a public bath, shall be guilty of an offence, and shall be punishable on conviction by a magistrate with a fine not exceeding fifty dollars, and may be sent to a leper asylum to be detained there until released by order of the Governor.

Section 14.—Any person received into an asylum in pursuance of this ordinance may be detained there until he is transferred or released, and in case of escape he may be arrested by the superintendent or by any police officer or servant of the leper asylum, or by any police officer, and again sent to and

received and detained in the asylum.

Section 11.—A leper who is not a native of the Straits Settlements shall not be landed in any part of the colony, and the master or other person in charge of the ship who permits, or omits to prevent, the landing of any person whom he knows or has good reason to believe to be a leper, shall be punishable on conviction by court of two magistrates, with a fine not exceeding 500 dollars.

Section 15.—The penalties incurred by the alleged leper, by the persons who landed him, or employed him in a prohibited occupation, &c., shall only be imposed on certificates delivered by two qualified medical practitioners attesting that the alleged leper is really a leper.

(d) The fourth and last division of the Leper Acts shows what legal measures have been introduced into British India and its dependencies for the suppression

of the disease, and for the care of lepers.

In the year 1890 an important commission was sent out to India under the auspices of the National Leprosy Fund. Its members spent considerable time in the country, and ultimately issued a voluminous report, in which the following recommendations found a place:—

(1) The voluntary isolation of lepers.

(2) Prohibition for lepers to follow certain occupations.

(3) Enforcement of municipal regulations against vagrant lepers.

(4) Enlargement of existing asylums, and creation of new asylums in the neighbourhood of towns.

(5) Foundation of colonies or farms in rural districts.

(6) Institution of orphanages to receive the children

of lepers.

Shortly afterwards the Bombay Municipality, under the provisions of some old local Act relating to vagrants generally, arrested all mendicant lepers and confined them in a leper asylum. This circumstance is not mentioned by Dr. Jeanselme, but it deserves to be recorded, not only because lepers were then for the first time in the annals of British rule in India compulsorily segregated, but also because the success of this measure in Bombay made the task of legislating for the isolation of lepers in other parts of the Indian Empire a very simple matter. In 1894 the Bengal Government passed a Lepers Act providing for the compulsory isolation of vagrant lepers, and forbidding lepers to engage in certain occupations. Burmah and other local governments asked that the Bengal Act should be extended to them, but the Governor-General in Council, considering that one uniform Act would be preferable to separate Acts, published in 1896 a Leper Act which could be applied to the whole of India. This Act has since then been completed by additions, which do not modify its essential provisions, and is called the Leper Act of 1898. In principle it extends to the whole of British India and its dependencies, but in order that it may come into force in any province, it is necessary for the Local Government to declare by notification in the official gazette that it extends to such province.

This Act provides for the isolation of vagrant lepers, and prohibits lepers from following certain trades and

occupations.

The important sections of the Act are as follows:—
Section 6.—In every area in which the Local Government has by notification decided that pauper lepers shall be sent to an asylum, any police officer shall arrest without warrant any person who appears to him to be a pauper leper. The police officer shall immediately take, or cause to be taken, the person so arrested to the nearest police station.

Section 7.—The suspected person shall be brought without delay before an inspector of leprosy. If the inspector finds that the person submitted for examination is not a leper as defined in Section 2 (i.e., a leper in whom the process of ulceration has begun), he shall give him a certificate in form A, and the leper shall then be immediately released.

#### CERTIFICATE A.

I, the undersigned certify that on the day of at I personally examined , and that the said is not a leper as defined in the Leper Act, 1898.

Given under my hand this day of , 189 . (SIGNATURE).

Inspector of Leprosy.

If, on the contrary, the Inspector is of opinion that the person is actually a leper as defined in Section 2, he shall give a Certificate in form B to the police officer, in whose custody the leper is, and the leper shall then without any unnecessary delay be sent before a magistrate empowered under the Act.

#### CERTIFICATE B.

I, the undersigned hereby certify that on the day of at I personally examined , and that the said is a leper as defined in the Leper Act, 1898, and that I base this opinion on the following reasons, particularly

Given under my hand this day of (SIGNATURE).

Inspector of Leprosy.

Section 8.—If it appears to the magistrate according to Certificate B, that the person arrested is a leper, and that he is moreover a pauper, he shall give him a certificate in form C, and shall have him conducted to the asylum by a police officer.

#### CERTIFICATE C.

To the Superintendent of the Leper Asylum.

As it has been proved that is a pauper leper as defined by the Leper Act, 1898, you are hereby authorised to receive the said into custody, together with this order, and keep him until he is released by order of Government, or of the District Inspector.

Given under my hand and seal this day of , 189 . (SIGNATURE).

Magistrate.

Section 9.—If the person declared to be a leper objects to this decision, the magistrate may, after examining the inspector of leprosy, maintain or alter his order, or he may direct that the suspected person be placed under observation.

Finally, if a relative or friend of the pauper leper undertakes in writing to give him proper care and prevent him from begging, the magistrate shall entrust the leper to the relation or friend: if he thinks it necessary he may demand security.

The foregoing résumé of the cardinal features of the various Leper Acts in force in the different possessions of the British Empire is of considerable interest, and may possibly be of service to those who are unable to

consult the original Acts.

The rigour of the Queensland Act making the

omission to notify a case of leprosy an offence punishable with a fine of £100 is in marked contrast to the Acts which aim only at the segregation of mendicant lepers who have no visible means of subsistence.

There is much in Dr. Jeanselme's small book to which no reference has been made, but colonial administrators who contemplate leprosy legislation might study its pages with advantage.

It is not encouraging to read that in the asylums at Mandoloo and Jerajak (Straits Settlements) the treatment of the disease has been found ineffective, and has therefore been given up.

## TROPICAL FOOD ADJUNCTS—PREVENTION OF DISEASE. SPICES.

By T. M. Macknight.

Las Palmas, Canary Islands.

I have often wondered why spices are so plentiful in the tropics, but while engaged in writing a book on tropical food I have been enabled to solve the mystery. In my desire to let this information be known as soon as possible, I now write a special article on this subject, which is of such immense

importance.

În tropical countries, which lie between latitude 23° South and 23° North of the Equator, the inhabitants use spices daily with their food just as we use pepper, salt, &c., without any thought of their antiseptic value, but simply because they are pleasant to the palate and cause their food to be more agreeable. When the spices are eaten with the food a certain beneficial effect is caused to the digestion, viz., stimulant and carminative. But there is a secondary effect, which is perhaps even more beneficial, in the fact that the volatile oil passes out from the body, mostly unchanged, through various channels, but chiefly through the lungs and skin. So that in the tropics Nature has provided antiseptics which, in passing out by the lungs and skin, kill the hurtful microbes which might be breathed in, and also prevent, to a great extent, the attack of mosquitoes. It is a well-known fact that insects, including mosquitoes, dislike volatile oils and will probably not attack an individual using spices as a food adjunct.

Besides the general use of aromatics or spices, each country has its compounds or combinations as follows: In Africa, Malagueta pepper, &c., with baobab leaves; in South America and the West Indies, "cassareep," which consists of concentrated mandioca juice with well-known aromatic; in the East Indies, "curry powder," consisting of cardamoms, turmeric, cloves, cinnamon, &c.; in South East Asia, "pan," which consists of betel pepper leaf, betel nut and lime. The betel pepper leaf has two volatile oils, and the betel nut contains a little volatile oil. The lime probably acts as an astringent on the bowels, which have sometimes a tendency to relaxation—tropical dysentery.

It is interesting to notice that spices grow where there is a high rainfall combined with much heat, conditions under which malarial influences prevail.

#### PART II.

Mitchell Bruce, in his "Materia Medica," page 243, says that "the aromatic volatile oils are in the mouth antiseptic, and also increase the circulation of the blood, exciting the nerves of taste and smell (flavour) powerfully. Several results of the first importance in digestion follow, viz., increase of saliva, increase of mucus, reflex increase of blood to the surface of the stomach, stimulation of appetite, increase of relish by pleasing flavour, in a word, desire for, enjoyment of, and digestion of food. In the stomach the effect on the vessels and nerves is continued, and here it is generally described as carminative. Besides causing increased flow of gastric juice by stimulation of the mouth, these substances are powerful stomachics in several ways. The blood vessels of the surface of the stomach are dilated and the nerves of the same are first excited, then soothed, the contents of the stomach, if decomposing, as in dyspepsia, are partially disinfected. Their reflex influence is equally important. The muscular coat of the stomach is stimulated, thus increasing gastric movement, expelling flatulence, heart vigour increased, spinal and cerebral centres temporarily excited. Thus they are general stimulants. In the intestines they are still found partly unabsorbed, increasing local functions, stimulating intestinal movements, and expelling flatus. They thus prevent pain or spasm (colic). They enter the blood unchanged and whilst partly oxydised by the red blood corpuscles, leave the circulation mainly unaltered. They are excreted by the lungs, skin, kidneys, liver, and probably by the bowels. In passing through those structures stimulate and disinfect them." As it is now a well-known fact that the microbes of malaria fevers, &c., are in the blood, it is quite obvious that if the volatile oils enter the blood chemically unchanged and leave it again mostly in this condition, they will exert their antiseptic influence on the disease germs and kill them. Of course what applies to the oils in their isolated condition will apply to them when still in the bark or seed, &c., used as spices.

Richet, in his "Dictionnaire de Physiology," 1897, vol. i., p. 608, states that "Miguel has experimented with antiseptics in order to see which are the most powerful." The result has been to show that bichloride of mercury, &c., are the most powerful; volatile oils and hydrocyanic acid (prussic acid) are placed in the next class; carbolic, oxalic, tartaric, and citric acids in the third class; boracic acid and hydrobromide of quinine in the fourth class.

Foster (U.S.A.) "Practical Therapeutics," vol. i., p. 448, under "Germicides," states that "Cadeac and Meunier have experimented with about ten volatile oils in order to ascertain the length of time required to kill the microbes of typhoid fever. The only spice oils tried were oil of cinnamon and oil of cloves. These beat all the others in the rapidity with which they killed the microbes." The microbes of malarial fevers, cholera, and tropical dysentery, so far as I know, have not been experimented with, as they have only comparatively recently been thoroughly classified. All microbes of the class referred to belong to the lowest forms of animal life, viz., the protozoa—and probably antiseptics act

similarly on all. The malarial microbe is easily killed outside the body, in fact it is difficult to keep alive, therefore in the body the volatile oils will act

easily upon it.

The most recent researches in medicine show that the three principal diseases in India are fevers, cholera and tropical dysentery. In all these complaints the microbes are present in the corpuscles of the blood and have entered the body by the lungs, with the food and water or, as recently proved by Major Ross (Director of the School of Tropical Diseases, Liverpool), by the bites of mosquitoes. Allbutt, in his "System of Medicine," 1897, vol. ii., p. 309, states that these microbes are the "immediate cause" of the disease. They have recently been identified, classified, and have received various names. Quinine, as Mitchell Bruce, in his "Materia Medica," p. 265, and Bartholow's (U.S.A.) "Materia Medica," p. 203, informs us, acts "as an antiseptic and kills the microbe." This drug constitutes the usual medical treatment of malarial fevers, but no one has ever realised the great value of the spices which are used as a food adjunct and not as a medicine. They act as a constant preventative to the above diseases by killing the microbes if they enter by the lungs, alimentary canal, or skin.

Bartholow's (U.S.A.) "Materia Medica," 1896, p. 366, states "there is a distinct relation between the antiseptic and antipyretic properties of various members of the group of antiseptics, as they have the power to depress temperature in the same ratio as they are active in destroying disease germs or forments"

ferments.

G. F. Butler (U.S.A.) "Text book of Materia Medica," 1896, Section "Aromatics," says that "the aromatics (spices) are powerful antiseptics and possess properties very similar to the more typical antiseptics." He also goes on to state that "during the cholera in Paris and London, perfumers were immune," and also that "when the Dutch destroyed the clove tree in one of their East Indian colonies it suffered from epidemics and disorders unknown before."

#### PART III.

Peron, in his "Voyage aux terres Australes," "was convinced that he preserved his health during a long and difficult voyage by habitual use of betel; while his companions, who did not use it, died mostly of dysentery."

Bancroft, in his "Natural History of Guiana," states "it is a general mistake that spices are detrimental, whereas nothing is more productive of health, and we find Nature provides and has taught the inhabitants their use. They season their food with a great quantity of pepper (chillies). By this practice the Indians wholly preserve themselves from intermittent fevers which are endemical to the other inhabitants of Guiana who do not imitate them."

It is recommended that, considering the great importance of this subject, every museum and botanical garden in the tropics should have specimens of its spices, giving also the local as well as the scientific name, with a few remarks as to the mode of preparation for consumption.

The author would be glad to receive further information, as it is certain that each country must have other products of a similar nature which have not been recorded by travellers and explorers. Any bark, leaf, seed, or root having a perfume, pleasant or unpleasant, and commonly used as a food adjunct. should be noted.

## British Medical Association.

(Continued from p. 359.)

CAUSATION OF ENTERIC FEVER IN INDIA.

By Andrew Duncan, M.D., B.S.Lond., M.R.C.P., F.R.C.S. Lieutenant Colonel I.M.S. (retired); Physician, Seamen's Hospital Society, Royal Albert Dock.

THE ETIOLOGY OF ENTERIC FEVER IN INDIA.

THE subject of the etiology of enteric fever in India is one that has been provocative of a vast amount of discussion, and has in its time excited the evolution of very curious theories to account for its increasing prevalence. I would, however, venture to submit that, if there is one country in the world where we would expect to find enteric fever rampant, it is India, and that it is rather a matter for surprise that the present large number of men who fall victims to the disease is not larger.

Before laying before you what I consider are the essential factors in the causation of the disease, I will briefly comment on some of the theories that have

been upheld concerning enteric in India.

(1) The Vicarious Theory of Martin.

(1) Hepatic insufficiency. In consequence of an excess of work being thrown on the hepatic system, either by an absorption of putrid matter or otherwise, there is an increased demand on the hepatic function, responded to at first by an increased on the hepatic function, responded to at first by an increased activity of that function. Soon, however, the liver is unable to come up to time, so to speak, and can no longer bear the strain of eliminative work thrown on it. The second element now comes in—namely, (2) a vicarious and abnormal activity of the intestinal glands, supplemental to the hepatic insufficiency. This eliminatory function of the intestinal glands at least the second contact of the intestinal glands at length leads to a suppurative enteritis. This vicarious action is, in its turn, furthered by the third element—namely (3), an idiosyncrasal proneness of the glands to this abnormal function.

In this way Dr. Martin would explain the origin of enteric fever from "increased temperature," or its occasional "spontaneous origin," and also its non-occurrence or rarity amongst

the natives of tropical climates.

This theory requires little to refute it, for the glands affected in typhoid fever are the glands of Peyer; and the glands of Peyer are absorptive and not eliminative.

(2) The transformation theory of M. Colin.—This French authority held enteric fever to be a unique malady in the tropics, and to result from the transformation of fever primarily paludal into enteric fever. He also held that in the tropics enteric fever may be spontaneously developed by its transformation from all acute febrile states. Now, if this were true, I would certainly agree with M. Colin that the enteric fever of the tropics is a unique malady, for we are here asked to believe that the sporozoon of malaria can become transformed into the bacillus of Eberth. But apart from the zoological difficulties of this sup-

position, the disconnection of enteric with malarial fever has been frequently noticed. Take, for instance, Demerara and British Guiana: were the two fevers allied, these two localities should have furnished a high ratio for both diseases, whereas, as Welch shows, the contrary is the case.

(3) The theory of Surgeon-General Moore.—The late Surgeon-General Moore, of Bombay, did not believe in the specific nature of any fever. According to him, enteric fever was simply a phase of fever, not a specific disease, while the enteric spots are only a petechial eruption. The eruptions of enteric, typhus, scurvy, and purpura are identical. Now, of course, on this theory, cases of enteric fever would increase and multiply; but it is only necessary to point out as regards the identity of the eruption, that that of the latter three does not disappear on pressure.

(4) The theory of Sir Joseph Fayrer.—This authority thus writes: "To attribute all cases of enteric fever to fæcal poisoning is erroneous and dangerous; that geographical position and climatic influences, heat, moisture, organic decomposition, miasmata, and a variety of aerial and telluric conditions are more likely

than a specific cause in India."

This theory may be considered jointly with:-(5) The climatic theory, which states "that climatic influences acting on young and undeveloped constitutions, predisposed in some way specially to develop typhoid, may start the disease" (Clark, quoted by Fayrer), and that "typhoid fever in the British soldier in India is primarily due to climatic influences (Bryden). Summarily stated, this theory is that climatic agencies acting on a young soldier recently arrived in India will start the disease. And with this is interwoven the influence of "atmospheric waves" of other writers. I believe by some observers the idea that a hot climate can per se start specific disease is still held, although, luckily for the sojourners in India, this dangerous theory is year by year less held. One might as well say that a hot climate could produce the various fauna and flora per se without the specific seeds thereof. Dr. Billings, of America, tersely criticises this idea in an incisive manner, when he states that "epidemic constitution is merely another phrase for want of knowledge"; whilst Dr. Edmund Parkes, the former revered Professor of Hygiene at Netleya man whose memory will ever live in the minds of those who had the good fortune to sit under him, and of whom it may be truthfully said that his lovable disposition was combined with one of the acutest, if not the acutest, intellects that ever graced the medical service of the army-rightly spoke of such causation as belonging to the "mythical region of epidemic constitution.

(6) The theory of Surgeon-General Gordon, of Madras.—This officer held that there was no such

disease as enteric fever in India at all.

(7) The theory of Sir Antony Home.—Subsequent to the last expression of opinion was that of this authority. He ordered that all fatal cases of fever in which at the post-morten examination any ulceration of the intestines was found were to be returned as cases of enteric. I cannot better criticise this view than in the words of the late Dr. Wall of the Indian Medical Service: "I believe that a large proportion of cases returned as typhoid fever have no right to that name. If a man die in India after having an elevated temperature and an ulcer be found in his intestine, the case is at once called typhoid. But it takes a great deal more than an intestinal ulcer to make a typhoid fever. I have seen many cases that could not with certainty be referred to any type of fever, but which had, on the whole, more resemblance to remittent than any other, and which were found after death to be coincident with intestinal ulceration, but an ulceration distinctly not typhoid. It was an irregular ulceration, by no means selecting the site of Peyer's patches, and very often encircling the intestines; and my experience is that this form of ulceration often occurs in cases that would better bear the name 'remittent' than anything else."

It is proverbially more easy to criticise than to construct a theory; but as regards the prevalence of enteric fever in India, I would lay down the statement that if there ever were a country where we should expect the white man to suffer from this disease, that country is India. And this statement holds good whether you hold with Murchison the "pythogenic theory," or with others the specific theory of fever. The factors concerned in the evolution of this fever in India are to be found in the following circumstances:—

(1) The yearly advent into the country of a large body of subjects at an age most liable to the disease.

(2) The country presents an environment to these subjects also most favourable to the disease.

As to the first heading.—The age at which the British soldier arrives in India is precisely that at which anyone is most liable to the disease. This has been found to be the case everywhere. M. Andral found that young medical students, for instance, were most likely to be attacked with enteric fever within a few days of their arrival in Paris. He forbore, however, to state that there was something in the climate of Paris especially calling forth enteric fever in young recently-arrived medical students.

As to the second heading.—The young soldier on his arrival in India is daily exposed to the chances of meeting with the specific infection of enteric, except during the period that he lives in his barracks, and here even, as I shall show presently, agents of infection can creep in. Doubtless if the soldier never left his barracks there would be much less enteric, but of necessity he cannot be confined there. In his walks abroad he goes to the bazaars or amongst the villages neighbouring to the cantonments. The late Professor Maclean, in alluding to these bazaars, stated that "they stand on soil for ages sodden with excrement." And another authority writes: "There is no station in India, however carefully its sanitary condition may be attended to, where the conditions for fæcal contamination of water easily accessible for drinking, though not intended for that purpose, does not exist."

Thus, on the pythogenic theory, there can be no

Thus, on the pythogenic theory, there can be no difficulty in accounting for the origin of enteric fever. But at the present day it is held that a specific disease must have a specific cause; so that the presence of the bacillus of Eberth must be premised. Now as regards the natives of India, of late years the evidence has been increasing that they are subject to enteric. Sir William Guyer Hunter, from his experience as

Professor of Medicine at Bombay, states that no race or sect is exempt. Long ago Scriven found it in the natives of Lahore. Deputy-Surgeon-General A. C. de Renzy, C.B., who did so much to further the sanitary condition of the Punjab during his term of office, drew attention to the enteric fever prevailing at the gaol at Rawal Pindi, giving perfect histories and post-mortem results. Chevers noted it in Bengal, Brombie in Burmah, O'Brien in Assam. Wright recorded cases in the 6th Bengal Infantry. Drury, Professor of Pathology at the Medical College, Calcutta, believes it to be more common in the natives of Bengal than is supposed. Freyer, of the R.A.M.C., showed by the Widal test that the majority of natives had had it in their youth; whilst Elliott of Madras finally states that all natives suffer for it at some time or other, and hence that a degree of immunisation is established, rendering the fever atypical.

Now if this be true, what does this mean? It means that owing to the want of sanitation the soil of India must be contaminated continually with the typhoid excreta and bacillus of Eberth. The vitality of the bacillus of Eberth is exceedingly long. Cayley records a case very pertinent in this respect. Typhoid stools were burnt in a dunghill. Some five weeks after, five persons employed in removing dung from the heap were attacked with typhoid; their alvine discharges were buried deeply in the same heap. Nine months after, one of the two men employed in the complete removal of the dung heap

was attacked with enteric fever and died.

If we now consider that the soil of India is contaminated by the bacillus of Eberth, how then does the soldier get this organism into his system? Doubt-less (1) the liquids he drinks in the bazaars are responsible to a large extent, but in a still greater measure two agencies are culprits; I allude to (2) dust and (3) flies. The enteric fever rate rises in the hot weather; so does the dust storms. Anyone who has experienced one knows how impossible it is to keep the dust out of one's bungalow during a storm. Consequently the dust, bearing the typhoid bacillus, settles on food that may perchance be exposed, and so gains entrance to the system. An example of this occurred definitely in the Soudan in 1885, where it was held that much of the enteric fever was due to the patients' excreta being rapidly dried and then carried hither and thither by the wind. Lastly, as regards its diffusion by flies. We need only consider what happened in the Spanish-American war to understand what happens in India. Camps here were ravaged by enteric in spite of the most elaborate sanitary arrangements. A special commission appointed to inquire into the epidemic reported that it was due to the common house fly. The various camps were infested with millions of flies that carried the poison from the latrines to the food. Even with the purest water supply, whole messes and tents were infected at the same time.

I stated that even in his barracks the young soldier was exposed to the chance of infection. That this is so is evident from the fact that the chance of infection by flies cannot possibly be reduced to a negligible quantity; whilst considering the uncleanly habits of

the native cooks, it would be a miracle if the food were not infected. I need only recall the celebrated instance of an attack of cholera that seized a party of officers some years ago, and which was traced by the logical mind of Professor Hankin to the dirty jairans employed by the native servants—jairans that infected with the cholera microbe.

Thus, to sum up the subject, it appears to me that it is a matter of marvel that more men are not infected with enteric than is at present the case in India, con-

sidering that :-

(1) There is a continual supply year by year of a large body of men most predisposed to the disease. Thus every year a fresh stock of the infective agency

is added to the country.

(2) This large body of men most predisposed to the disease, though living nominally in highly sanitary barracks, are yet daily exposed to the infection of enteric contained in—(a) The liquids they imbibe in the bazaars: (b) the dust of the station; (c) the agency of flies.

(3) The country soil is, moreover, becoming yearly more and more impregnated with the enteric bacillus.

Prevention.-What hope have we of counteracting these morbific influences? We cannot stop the men from entering the bazaars; flies can scarcely be prevented from contaminating their food; dust-storms cannot be prevented. It has, indeed, been proposed to lay the dust in cantonments by water-carts. This, however, will go but a short way, for dust is carried by the winds not only from the roads and fields in immediate relation to the barracks, but also from afar One remedy is to annihilate the bacillus by burning the stools of the sick, and the most efficient way is to burn them with straw or some other vehicle impregnated with petroleum in incinerators, as recommended by the late Professor Du Chaumont. Especial attention must be paid to the urine, as this is shown by Dr. Horton-Smith to contain the bacillus for a longer time than the motions. It is, however, more important to stop anyone getting enteric than to stop any further extension for a previous patient; and to do this the only remedy would seem to be that of compulsory inoculation. Vaccination for small-pox is compulsory in the army as a prophylactic; and that vaccination has had a beneficial effect can be testified by any medical officer of some years' standing. I first went to India the majority of recruits were marked with small-pox; when I left, the majority of recruits were not so marked. The statistics hitherto published show that the method of preventive inoculation, so ably advocated by Professor Wright, small in number though they be, has had a well-deserved success. Thus, to briefly enumerate the results gained by this method, they mention:

In India, 1899: (a) The percentage to strength of cases of typhoid was—amongst the inoculated 0.98 cases, with 0.2 mortality in 4,502 cases; amongst the non-inoculated 2.54 cases, with 0.5 mortality in 25,851 cases. (b) Amongst the 15th Hussars at Meerut-360 inoculated gave 2 admissions, 1 death; 179 non-inoculated gave 11 admissions, 6 deaths; or, in the inoculated 0.55 per cent., mortality 0.27 per cent.; in the non-inoculated 6.14 per cent., mortality

3.35 per cent.

In South Africa, at Ladysmith, in the Princess Christian Hospital, in the Portland Hospital, in the Scottish National Red Cross Hospital, in the Kroonstadt Hospital, the results were all very favourable to inoculation. The only adverse report is one by Dr. Washbourn, of Guy's Hospital.

In Egypt and Cyprus during 1900, amongst the non-inoculated of 2,669 cases the cases of enteric were 2.5 per cent., with a mortality of 0.4 per cent., whilst amongst the inoculated of 720 cases the cases of enteric were 0.14 per cent., with a mortality of 0.14

Lastly, during the great epidemic at Maidstone, of 84 nurses and attendants inoculated not one was attacked; whilst of 120 not inoculated 16 were attacked. The evidence in favour of the prophylactic

action of inoculation, so far, is incontestible.

Lieutenant-Colonel A. Crombie, I.M.S. (retired), did not believe that typhoid in practice was so common in India amongst natives as amongst Europeans. In some parts and amongst certain people the disease was prevalent, while in other parts it was almost unknown; thus amongst the Ghoorkas typhoid was very common, whereas in Madras and Lower Bengal enteric ulcerations were seldom found post mortem. Dr. Crombie mentioned an observation pertinent to the value of Widal reaction. He examined the blood of three natives of Bengal under the age of 30 living in London, and of three of similar race and similarly placed over the age of 40. The blood of the first group of cases gave well marked Widal reaction, although the men appeared in good health, never had they ever been laid up with typhoid nor were they ill at the time of examination. Of the cases over 40 years of age that were examined, no reaction occurred with Widal's test. Dr. Crombie believed that there were fevers which ran a twenty-one days course in India, in which there was no eruption, no diarrhœa, and but occasionally an enlarged spleen, which were not typhoid at all. In South Africa 75 per cent. of the cases returned as typhoid gave Widal's reaction. Concerning the value of Wright's anti-typhoid inoculations he had noted that of 300 cases convalescent from typhoid in South Africa 60 per cent. of the 300 had been inoculated once and 10 per cent. inoculated twice. He knew of one case inoculated a second time with six months' interval between inoculation to have had typhoid two months after the second inoculation, and second attacks of typhoid were not uncommon.

Captain W. R. Battye, I.M.S., stated that with the idea of testing the method of spread of typhoid an experiment had been made in India in which servants were made to rinse their hands in water in a common basin, but although they continued to do so for many days the bacillus of Eberth was not found in the water in the basins. Captain Battye believed that a harmless organism might become pathogenic under certain conditions, such as the presence of decompos-

ing matter would engender.

Lieut.-Colonel J. L. Poynder, I.M.S., said that enteric in India was probably a disease of youth, and that it was possible the men mentioned by Dr. Crombie as being over 40, and giving no Widal reaction, in all probability had had the disease in their

youth.

Professor F. M. Sandwith, M.D. (Cairo), held that the anti-typhoid inoculation method of Wright was not yet complete in any way. They scarcely even knew what they were injecting, and the after-effects were very uncertain. Professor Sandwith mentioned that of twelve nurses who went to South Africa three got typhoid, although none of them died. He advocated systematic blood examination when Wright's treatment was being tried.

## SOME OPHTHALMIC COMPLICATIONS OF PLAGUE.

By Major F. P. MAYNARD, M.B., F.R.C.S.Eng., I.M.S., Civil Surgeon of Patna and Superintendent of the Temple Medical School.

ALL writers on plague describe the injected eyes as characteristic of the plague facies. The plague-stricken, and sometimes half-drunken, look which enables one often to recognise at a glance patients attacked by the disease is in part due to this injection.

Mr. Cantlie, in his article in the *Practitioner* Plague Number, says plague patients sometimes get inflammation in eye and loss of vision from changes probably beginning in the choroid. With this exception I have come across no description of the condition upon which this injection depends, or of the serious results

to which it may lead.

During the recent severe epidemic of plague in Patna I came across 12 cases in which there were ophthalmic complications. The notes are briefly recorded below. In all the attacks were severe, 7 had buboes that suppurated, and in the majority there was delirium or insensibility. The lesions met with were not, however, the result of lagophthalmus. They were rather the results of iritis and opacity of media apparently from interference with the nutrition of the eye.

Of the 12 patients examined 6 recovered with one eye sound. In the remaining 18 eyes the following lesions were noted: Cornea-hazy in 4, opaque in 2, and sloughed in 4. Iris-Signs of iritis, varying from a few dots of pigment on the anterior capsule to occlusio pupillæ, in 12 cases, and in 3 others the iris was prolapsed. Sclera—Scleral staphyloma was met with twice. In both cases it was ciliary, and in each the dark projection was separated from the corneal margin by a strip of healthy-looking sclera. In one the iris was evidently drawn up into the staphyloma, and its upper portion was not visible through the clear cornea. Lens—was hazy in 7 eyes and quite opaque in 5. The media were hazy in 6. The fundus was normal in 3, showed a hæmorrhage in 1, and the appearance of a limited retinitis pigmentosa in one other. The tension was diminished in 12 cases, normal in the rest. Vision-Nil in 5, p. l. only in 8, and fairly good in 5.

The enumeration of these lesions shows the serious nature of the eye complications of plague when they occur. The most remarkable feature in plague postmortem examinations is the extensive extravasation of blood that are met with throughout the body. I was prepared and on the look-out for similar hæmorrhages in the eye. In only one eye was one found. The media are so hazy usually, however, that more examinations of the fundus in various stages of the disease

are required before dismissing this as a possible explanation of the destructive changes met with. The rapid development of seleral ectasiæ and the usual diminution of tension are rather remarkable. Scleral ectasiæ usually develop slowly, and oftenest from increased tension. In these eyes the sclerotic must have become less resistant to normal or even reduced pressure.

Treatment was of no avail, because started too late perhaps, in all except one case, where potassium iodide and nux vomica internally, atropine and blisters on the temples, seemed to have a good effect. The tension rose to normal, and the sight improved. It was the good result after treatment in this case that caused several of the others to consult me.

LEPROSY BEING ERADICATED IN THE HAWAIIAN Islands.—According to a recent cable, leprosy is being slowly but none the less certainly eradicated in the Hawaiian Islands. Five years ago there were over 1,300 inmates at the leper settlement on the island of Molokai, but when the annual visit was made a few days ago there were barely 900. This is due, not so much to any scientific treatment of the disease, as to the gradual extinction of the native race, which, alone, in the opinion of Superintendent Reynolds, of the settlement, will cause the complete eradication of leprosy. Last year there were an even 100 lepers sent to the island, while only 50 have been sent during the first nine months of the present year. In the biennial period, ending December, 1900, directly after the islands had been annexed, over 500 were taken to the settlement. This was due, not to any increase in the disease, but to the fact that the question was taken out of the hands of the party previously in control, and many afflicted persons who had remained in Honolulu through political influence were hurriedly bundled off to the place of segregation. The disease is thought to have been brought to the islands thirty years ago by a Chinaman, and as soon as it once reached the natives it spread with great rapidity. The Hawaiians are much given to an outward display of affection, especially kissing and embracing. They smoke the same pipe, eat from the same dish, and in other ways lead to a direct inoculation of the disease. The same reasons are given by the physicians for the great increase in tuberculosis among the natives. Every accommodation is provided for the lepers at Molokai. They have their own homes, a school for boys and one for girls, and seven churches for the little town of 900 people. Besides the lepers there are about 100 persons at the settlement-teachers, ministers, and nurses. Of the 900 lepers on the Island of Molokai, all but fifty are native Hawaiians. There are only fifteen whites and thirty Chinese. Expert physicians who have made a lifelong study of leprosy in Japan, France and China, have been studying the conditions, but have found no suitable remedy for the disease. The local government has given up experiments, and there is a general feeling that the United States should now take up the study with the purpose of effecting a permanent cure.—New York Medical Journal, October 12th, 1901.

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THE

## Journal of Tropical Medicine

NOVEMBER 15, 1901.

### A CANCER ENQUIRY EXPEDITION.

How the Etiology of Malignant Disease may be Elucidated by Enquiries and Observations amongst Natives of the Tropics.

Has the time come for a malignant disease enquiry expedition? We have been familiarised lately with "Malarial Expeditions," "Beri-beri Expeditions," "Yellow Fever Expeditions," &c., so that the term "Cancer Expedition," ungainly though it seems, is not quite anomalous or eccentric. Malignant diseases, even allowing that they are not increasing, which is doubtful, are a scourge of sufficient importance to justify enquiries to be made in every direction and by every method at our disposal. Local enquiries in European countries have yielded as yet but few, if any, facts of scientific precision, and we are as much in the

dark as ever concerning cancerous infection. 'In Great Britain maps of the prevalence of malignant disease conveying much useful information have been published; statistics as to the prevalence of cancer in relation to telluric conditions are interesting; and even we have some imperfect knowledge of malignant diseases as they affect races. Bacteriology has as yet effected nothing practical in connection with the etiology of cancer, and the means of investigation at our disposal seem exhausted. There is, however, another aspect of the disease which lies open to us, namely, a world-wide enquiry as regards the prevalence of the disease. The natives of India, China, and other countries are popularly believed, and to a certain very limited scientific extent are known, to be, if not immune, at least much less liable to become the subjects of cancer than are the people of Western Europe, and of the more temperate countries of Northern America. this assumption correct? is a point worth deter-Were the enquiry conducted more mining. widely and still more thoroughly, not only might a great deal of useful information be obtained, but it is possible some facts of practical importance might be ascertained, for in this direction it would seem a possible solution of the cause of cancer lies.

Granted that certain people are liable to cancer whilst others are exempt, surely some sound conclusion could be deduced by a careful study of the facts. Granted, again, that certain people have been known within recent times to have acquired cancerous infection, a great step in determining either the immediate cause or the means by which the disease spreads will have been established. It is arguing from this standpoint that expeditions to determine the cause or mode of spread of such diseases as malaria and beri-beri have been sent out, and if it is hoped to unravel the mysteries of these scourges by such enquiry, the same may be claimed for an expedition concerning cancer. We know that in some islands of the Pacific malarial diseases prevail, whereas in adjacent islands malaria is unknown. Into these subjects enquiry is being made with every hope of determining the initial

factor of the disease. We know also the tubercle bacillus does not thrive in certain countries, nay more, that it is killed by the atmospheric conditions appertaining in these localities.

Every disease would seem to have its home or endemic centre, and there is no disease that affects equally the whole human race. Diseases have their geographical distribution as pronouncedly as have plants and animals. A few examples will suffice. Yellow fever has a distinctly local distribution. Scarlet fever disappears from the category of disease in equatorial regions. Leprosy, on the other hand, increases in frequency as the equator is approached. Cholera has its endemic centre only in tropical and sub-tropical countries, and the same may be said of dysentery. plague, sprue, yaws, &c., &c. Is it true, therefore, that cancer has a geographical distribution? Does it, in contradistinction to leprosy, diminish as the equator is approach, or is its prevalence determined by other factors than by climate merely?

The enquiry is not without difficulty nor yet without pitfalls for the scientific investigator. Natives, generally, are backward in coming to European doctors when suffering from certain diseases. Native women, amongst whom an inquiry concerning malignant ailments must play a prominent part, if it is to be thorough, are especially reticent, the more so if the disease they suffer from is likely to require surgical treatment. Every practitioner in the tropics must know how, whilst living in the midst of natives, he or she (for even lady doctors are not always taken into women's confidence) may form an erroneous impression concerning the prevalence of certain ailments. The writer had confirmatory experience of the kind whilst practising in Hong Kong. For five years after taking up residence there the writer saw no case of ovarian tumour. A woman, however, came for advice for a very advanced tumour of this nature. She was successfully operated upon, with the result that many cases of a similar nature, within the next twelve months, came under notice. The number kept increasing until a death after operation occurred, when no more patients suffering from this ailment were met with. Had the writer formed his conclusions concerning the prevalence of ovarian tumours amongst the women of Southern China from a five years' experience, a period seemingly entitling him so to do, a false and misleading statement would have been The same experience in a more the result. limited degree befell the writer in regard to malignant disease. It was only after several years' residence in a warm climate, that malignant disease of the breast was seen in a native, or to be more exact, in a half-caste woman (British and Chinese). The last remark is especially interesting and noteworthy, namely, that the patient suffering from cancer was a half-caste; it may have been due to her partly European origin that he became infected.

Enquiry into the subject of malignant disease amongst natives of warm climates is not without difficulty, but were an expedition sent out from this country fully equipped, and conducted with tact and judgment, there can be no doubt a great deal of knowledge concerning cancer would be obtained. By collating such information a basis of study might be established, by following which some scientific precision might be given to the manner of investigating malignant diseases, which at present is for the most part purely empiric.

J. C.

## LIVERPOOL SCHOOL OF TROPICAL MEDICINE.

An important development has lately taken place in connection with the Liverpool School of Tropical Medicine, consisting in the establishment of a ball of residence for the use of students attached to it. It consists of commodious and well-furnished premises in Upper Parliament Street, a situation convenient for the Southern Hospital and for the Medical School, being on one of the principal tramway routes. The new hall was formally opened by the Lord Bishop of Liverpool on November 2nd, in the presence of a large gathering of citizens, representative of the philanthropy, commerce and medicine of the city.

Sir Alfred L. Jones, K.C.M.G., remarked that the idea of the hall of residence was conceived by certain gentlemen who thought that the Liverpool University might give some world-wide help by bringing over young men from the various Colonies, and giving them cheap means of University education, with a view to their returning home either as qualified

medical men or otherwise, to the great advantage of the natives. The time had arrived when commerce and science might be treated as economic as regards these countries and it was with that object that that hall, which they hoped by and by would be able to accommodate 200 students, had been established. It was hoped that the Colonies would put forward a number of youths, and that the shipping companies would give them free passages, so that the scheme of assisted education in Liverpool might be successful. They had to tender their thanks to Professor Boyce and particularly to Mrs. Boyce, for their labour in connection with that admirable home, which he was sure would be a great blessing to the students. He believed that the movement would be of great value to the world, and he hoped that that day would be a historic one in the development of the tropics.

The Bishor, in declaring the hall open, said that that new department would be watched with great interest from many parts of the world, and would, he thought, be fraught with great results. That home was the child of the Liverpool School of Tropical Medicine, which, although itself an infant, had already made its mark in the world, had its martyr in Dr. Myers, and had recorded a great triumph in the work

of Major Ross in West Africa.

The school sought to minimise the danger to European lives in West Africa, and the result would be that a large number of students would sooner or later be flocking to Liverpool from all parts of the world, for here, thanks to the existence of University College, they would have special advantages for the study, not only of medicine, but also of architecture, engineering, and many other things. A wise statesmaulike and true Christian spirit had led to the foundation of that hall. First of all it was a home for strangers in a strange country, where they would be cared for without being coddled, and sheltered without being put in straight-waistcoats. They would be under a trained warder, who would be an elder brother, counsellor and friend, to those living with him, to help and advise them as regards their studies, and help to form character, which after all, was the greatest wealth the nation or Empire could have.

It was also catholic. It made no distinction of nationality or colour of men's skin. Already he had been introduced to two residents, both of whom were Africans, and he believed that one of the promoters, the Hon. R. B. Blaize, of Lagos, was himself a native. Lastly, he could not help noticing that the home was wonderfully economical, because students were asked to pay only £1 a week, inclusive of three square meals a day. They all owed a great debt to the three kindly-hearted men who had enabled the hall to be opened free of debt, namely Mr. (now Sir), A. L. Jones, Mr. John Holt, and the Hon. R. B.

Blaize.

Principal Dale, in moving a vote of thanks to the Bishop to the three gentlemen just named, and to the Warden (Dr. Annett), spoke strongly as to the value of such a home to students brought from abroad into the midst of a great city with its dangers and temptations.

Sir A. L. Jones spoke of the continued progress of the school, which, he said, was now spending £5,000

a year.

## Rews and Notes.

ON THE PRINCIPAL AILMENTS OBSERVED IN THE BRITISH ARMY DURING THE SOUTH AFRICAN WAR.—
The published statistics on the various ailments met with in the British Army were as follows:—

There were 28,531 medical cases apportioned under the following headings: 5,462 typhoid fever; 2,963 rheumatism; 2,568 malaria; 1,872 continuous fever (simple); 1,527 diarrhœa; 986 jaundice; 719 influenza; 710 tonsilitis; 435 bronchitis; 22

rheumatic fever; 3,412 fatigue.

It will be observed that sun-stroke, in spite of the intense heat prevalent, does not enter into this list of ailments. The absence of sun-stroke during this campaign furthers the belief advocated by Dr. Sambon and others, that heat alone is not the determining factor in sunstroke (sirasis).

SIR ALFRED LEWIS JONES, K.C.M.G.—All who are interested in the Liverpool School of Tropical Medicine are much gratified to learn that its founder, Mr. Alfred L. Jones, has been created a Knight Commander of the Order of St. Michael and St. George. We congratulate Sir Alfred upon the well deserved honour.

## Current Miterature.

#### PERNICIOUS ANÆMIA.

Fourtanos of Syra, in a paper read at the Medical Congress held in Athens during May, 1901, attributes the condition of the blood in pernicious anæmia to a toxic substance formed in the digestive tube or in the blood itself. The toxin, according to Fourtanos, is produced in the hæmatopoietic organs, the liver and spleen, and the entrance of the toxin into the blood is the cause of the wholesale destruction of the red corpuscles.—L'Egypte Médicale, 1901.

In this matter we would refer M. Foustanos to the recent writings of Dr. William Hunter, of London, who goes a step further and proves by pathological specimens that pernicious anæmia is associated with, or dependent upon, an intestinal lesion of marked

characteristic.

### BERI-BERI.

Beri-beri in the Japanese Army.—The Director-General of the Medical Department of the Japanese Navy, Baron Saneyoski, publishes in the Sei I. Kwai Medical Journal, for April and May, 1901, statistics concerning the prevalence of beri-beri (kak'ke) in the Japanese Army, between the years 1884-1885. The report is interesting, because it was during the years in question that beri-beri broke out in the Japanese Navy; but until the present information was made public we had no knowledge that the disease prevailed in the Army as well as in the Navy of Japan.

The principal conclusions arrived at by the Baron

Saneyoski are-

(1) That in the East rice-eaters are the only persons affected by beri-beri.

(2) The improvement in diet in the Japanese Navy and Army since 1884 has extirpated the disease.

(3) That no other hygienic improvement has been recognised as having anything to do with this result.

(4) Rice-eaters transport beri-beri to places where

no beri-beri had existed before their arrival.

(5) Beri-beri and rice are inseparably connected; lack of nutritive substance is the cause of beri-beri. In the Japanese Army, and in the prisons, the introduction of barley into the diet, along with rice, caused a speedy diminution of beri-beri.

Beri-beri is more apt to occur amongst communities who are supplied with "white Chinese rice," than amongst those who consume "red Chinese rice." It appears, in support of the diet theory of causation, that the "red rice" yields, on analysis, a larger quantity of fat and albumin.

#### DYSENTERY.

AT the meeting of the New York County Medical Society, Dr. Simon Flexner of Philadelphia spoke briefly upon the subject of The Etiology of Acute Dysentery. He said that reports of bacteriological work in the tropics, Japan, Germany, and in this country upon the etiology of acute dysentery agree that there is present a septic organism, quite peculiar and not found in the body under normal conditions, which seems to be present uniformly when cases of acute dysentery arise. It would appear that the sporadic cases have the same origin as the acute dysentery, which is of particular importance in the consideration of epidemics. The micro-organism that has been discovered is that bearing more or less resemblance to the bacillus of typhoid fever. occurs in the intestines and can be obtained from the It does not occur in health or in other dejecta. Moreover, the blood serum will give a diseases. reaction similar to the Widal reaction. Dr. Flexner thinks it probable that, as a result of this work, the septic organism of acute dysentery has been observed. It is possible by the use of this organism to produce serum which may be curative.

ETIOLOGY OF TROPICAL DYSENTERY.—Flexner (Johns Hopkins Hosp. Bull., Baltimore) gives an account of his researches, carried out at Manilla, at the instigation of the Johns Hopkins University. Two main types of the disease were met with, acute and chronic, each with its distinct pathological appearances. In the acute variety, amœbæ were either absent, or in very small numbers, while in the chronic form they were more numerous and constantly present. the acute cases, in addition to the cocci and bacilli usually found in acute enteric conditions, he found bacilli of two types. Type 1 was identical with bacillus dysentericæ, described by Shiga of Tokio; and type 2 nearly allied to B. coli communis. The organism described as type 1 was the predominating organism in all acute cases, while type 2 occurred in small numbers in all cases. Details are given of the appearances, cultural characters, and pathogenesis of these organisms. Shiga's B. dysenterica differs from B. typhosus in (a) being less mobile, (b) displaying

more uniform production of indol, (c) after slight acid production it gives rise to increasing alkalinisation, (d) it is inactive to blood serum from typhoid cases, but reacts with serum from dysenteric cases, to which B. typhosus does not respond. He thinks that his results tend to confirm the B. dysenterica as the specific cause of acute dysentery, and open up the way for attempting a method of artificially immunising persons exposed to this very fatal disease.—Ind. Med. Record, October 16th, 1901.

#### FURUNCLES.

THE TREATMENT OF FURUNCLES .- According to the New York State Journal of Medicine for April, Philipson recommends salicylic acid, in 50 per cent. strength, in the treatment of well-formed furuncles. following paste is applicable for such conditions:-

Salicylic acid Salicylic acid ... Powdered starch ... .. 1 drm. ..

Lanoline . . . . . 1 oz.

M. Sig.: Apply locally and change three or four times a day, in order to hasten the necrotic process.

When the core has been eliminated, he advises treatment to favour granulations. Minute furuncles may be checked by applying the following:-

Tincture of benzoin Tincture of benzoin
Alcohol, enough to make ... 1 drm. M. Sig.: Apply locally three times a day.

In generalised furunculosis the parts should receive warm bath daily and then be rubbed with the following :-

R Salicylic acid 25 grs. R Salicylic acid . . . . . . . . . . . . 25 grs.
Vaseline, enough to make . . . 2 ozs.
M. Sig.: To be well rubbed in over the affected area.

#### LEPROSY.

THE CONTAGION OF LEPROSY.—The newspapers publish a despatch from Copenhagen stating that City Physician Feilberg, of that place, who recently visited the West Indies, is suffering from a marked case of anæsthetic leprosy, which he is believed to have contracted from a patient whom he attended while in the West Indies.—Medical Record, October 26th, 1901.

LEPROSY IN HAWAII.—According to a recent report of the Marine Hospital authorities in Hawaii there are now 909 lepers and 164 healthy persons in the leper settlement of Molokai. The cost of the settlement, including the housing, feeding, and clothing of these persons, is about 80,000 dols. per annum. three oldest patients at the settlement arrived in 1874, 1875, and 1879 respectively. The number of commitments to the settlements each year during the last decade, ranging from 132 in 1891 to 85 in 1900, show a gradual decrease, despite the fact that the hunt for lepers throughout the islands has never before been so vigorous. - Medical Record, October 26th, 1901.

Is LEPROSY CONTAGIOUS?—Dom Santon states that the careful and impartial study of this subject shows that leprosy is contagious; this power of contagion is not often exercised; hygiene and cleanliness render it almost nil; occlusive dressings, asepsis, antisepsis, and disinfection are sure means of protection. question of danger of contagion is much more simple than one would think. According to Hansen, "in

Clinical Review.

order that leprosy be communicated, there must, without doubt, be much uncleanliness." However, the observance of the conditions mentioned above will effectively prevent the contagion.—La Press Médicale, June 15th, 1901.

#### MALARIA.

A CASE OF MALARIAL REMITTENT FEVER TREATED WITH LARGE DOSES OF ARSENIC. - C. J. Gremillion reports a case of malarial remittent fever in a woman who exhibited a marked idiosyncrasy to guinine, that drug producing severe pain in the stomach, cramps in the legs, cold, clammy perspiration, and rapid, laboured respiration. She received five drops of Fowler's solution for three days every four hours, then every hour for two days, then every two hours for twelve hours, and afterwards ten drops three times a day. She made an uneventful recovery. The case is interesting because of the idiosyncrasy to quinine, and on account of the quantity of arsenic taken without symptoms of poisoning.-New Orleans Medical and Surgical Journal.

NOTIFICATION OF MALARIA.—At a meeting of the Board of Health, held in New York August 30th, 1901, a set of resolutions was adopted to the following effect: (1) That all public institutions, hospitals, homes, asylums, &c., be required to report all cases of malarial fever which come under observation, giving the name, age, sex, occupation and present address of the patient, and also information as to whether the attack is a primary infection or a relapse, and the address where the disease was probably contracted; (2) that all physicians in the city be requested to furnish similar information in regard to patients suffering from malarial fever under their care; (3) that the circulars of information of the Department of Health regarding "the causation and prevention of malarial fever" be mailed to the addresses in which malarial infection has apparently been contracted, and also to the addresses from which the cases are reported, when these are different; (4) that postal cards for furnishing the required data be prepared and forwarded to institutions and physicians for reporting the cases of malarial fever which come under their observation, as is done in other infectious diseases. -Boston Med. and Surg. Journal, September 5th, 1901.

#### EXCHANGES.

Annali di Medicina Navale. Archiv für Schiffs u. Tropen Hygiene. Archives de Medicine Navale. Archives Russes de Pathologie, de Médec., Carrotte de de Bacteriologie. Australasian Medical Gazette. Boletin de Medicina Naval. Boston Medical and Surgical Journal. Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology. British Medical Journal. Brooklyn Medical Journal. Caducée. Climate. Clinical Journal.

Giornale Medico del R. Esercito. Hong Kong Telegraph. Il Policlinico. Indian Engineering. Indian Medical Gazette. Indian Medical Record. Journal of Balneology and Climatology. Journal of Laryngology and Otology. Journal of the American Medical Association. La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal. Medical Brief. Medical Missionary Journal. Medical Record. Medical Review. Merck's Archives. New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyclinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo. Sei-i-Kwai Medical Journal. The Hospital. The Northumberland and Durham Medical Journal. Treatment.

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1.—All communications will be acknowledged in the JOURNAL under the heading "Letters and Communications Received." Contributors who do not see their names in the list should communicate forthwith with the Editors or Secretary.

 Manuscripts sent in cannot be returned.
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6.—Correspondents should look for replies under the heading "Answers to Correspondents."

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## Original Communications.

I .- On a Case of Fibromata of the Scalp. By J. H. Hugh Harrison, M.R.C.S. Assistant Colonial Surgeon, Public Hospital, Belize, British Honduras.

N. M., girl, aged 16, applied at the hospital for treatment. She was a native of the Mosquito coast, fully developed and in good health. She had had size from a small cauliflower to a marble and occupied a base about four and a half inches in length and four in width, about an inch and a half from the base of the nose obliquely across the forehead and head. The feel of the tumours was softish in some parts and hard in others; they were of a purplish-brown colour with irregular surfaces and of a shiny appearance. The weight made the tumours hang forwards and in order to obviate the pressure the patient used a pad of soft tissue paper on the bridge of the nose.

I operated and removed the entire mass; there was



Before operation.

these tumours for the past two years; they had commenced as round lumps, increasing rapidly in size and taking irregular shapes as they grew.

The tumours numbered over eleven and varied in



After operation.

considerable hæmorrhage, so much so as to alarm one, but which soon stopped on application of pressure and proper styptics. No measures were taken or attempted to bring the edges of the skin together, but the wound left to granulate. Later on, skin grafting was done successfully. On making sections for examination under the microscope the tumours were found to be entirely fibrous, in spite of feel and appearance as mentioned above.

The mass of tumours weighed over four pounds four

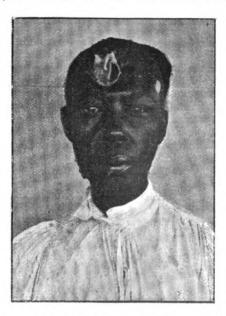
ounces.

Attached are photographs of tumours before and after the operation.

II.—TROPICAL SLOUGHING PHAGADENA; NECROSIS OF FRONTAL BONE; DESTRUCTION OF FRONTAL LOBES OF BRAIN; RECOVERY.

M. N., a negress, aged 52, was admitted into the Belize Hospital on October 20th, 1899. Her previous mode of living had been such as to encourage a scorbutic taint.

Two months previously she had been bitten by a fly on the forehead; the spot became tender and swollen, and a bleb formed. She let out the serum



with a pin on the fourth day, an ulcer then formed and gradually spread. In the meantime there was much pain, headache and fever, and the discharge from the ulcer became very offensive.

On admission she was emaciated and anemic, and the stench from the ulcer on the forehead was unbearable. The ulcer was somewhat oval in shape and measured four inches by five inches, occupying the whole of the forehead; the base of the ulcer was formed by the frontal bone, which was necrosed.

The bone being movable, I removed it with the aid of a pair of forceps. A considerable quantity of greenish, highly offensive pus was thus released. The bone removed proved to be the whole of the frontal bone from the superciliary ridges upwards, and it was perforated in places. After cleaning the cavity, it was found that the major part of the frontal lobes had been destroyed by suppuration. The patient made a good recovery and was discharged after being 102 days in hospital.

The case is interesting as but another example of how extensive lesions to the frontal lobe of the brain may result in recovery. It is interesting also as showing how a very small amount of external injury (in this case the bite of a fly) may, in a debilitated scorbutic subject, produce "tropical sloughing phagadena;" and lead to destruction of bone and of tissues subjacent to the bone.

## British Medical Association.

(Continued from p. 383.)

MALADIES OF EUROPEAN CHILDREN IN HOT CLIMATES.

By Lieutenant-Colonel A. CROMBIE, I.M.S., M.D. (retired).

SPEAKING generally, it may be said that the sickrate of European children is lower in India than it is in the United Kingdom. In saying this I refer particularly to the children of civilians, amongst whom my experience exclusively lay. I have no statistics with which to confirm this estimate, but I am confident that the returns of such an institution as the European Orphan Asylum at Calcutta would bear me out. I am the more confident in making this statement because I find that the returns of the Army Medical Department with regard to the children of European soldiers in India, who cannot be so uniformly well cared for as those of the comparatively well-to-do civil European population, show hardly any increase over British rates. Thus in 1899 the sick-rate of 5,500 soldiers' children in India was 527·1 per 1,000, while in the United Kingdom it was 507·3. This was an average non-epidemic year, and may be taken as fairly representing the effect of normal conditions on the admission-rates of children in the two countries.

When we come to speak, however, of the death-rate the matter takes an altogether different complexion. The death-rate of soldiers' children in the United Kingdom is 18·31, while in India it is 41·09 per 1,000. It is obvious, therefore, that the illnesses of European children are more frequently fatal in India than are those of children at home, and it behoves us to inquire in what diseases and in what way these fatal illnesses occur. For the purposes of this inquiry I have drawn up the above comparative statements, in which the relative admission and death-rates of the more important diseases to which children are particularly liable may be compared and contrasted in these different circumstances.

This table is a very instructive one, and brings into prominence the following interesting facts with regard to the diseases common to both countries, namely, that when you deduct from the 2,899 admissions among the 5,500 European children in India the 535 cases of malarial fever which is not common in both countries, the admission-rate in India is reduced to 429.8 per 1,000, or just about 100 per 1,000 less than it is in the United Kingdom; so that if you could defend these children from being bitten by the Anopheles mosquito, their chances of illness would be

10 per cent. better in India than in this country. It is a question largely of mosquito curtains, and is one to a great extent within the control of those responsible for the care and management of children in India. It is to this care, to a great degree, that the comparatively good health of the children of the well-to-do civil population is probably largely due.

SLE SHOWING THE SICK RATES AND DEATH RATES PER 1,000, AS WELL AS THE CASE MORTALITY OF THE PRINCIPAL DISEASES AFFECTING CHILDREN IN INDIA AND THE UNITED KINGDOM IN 1899.

	A	Admission-Rate				DEATH		CASE- MORTALITY PER CENT.		
	United Kingdom	India	United Kingdom	India	United Kingdom	India	United	India	United Kingdom	India
		-	+	+			+	+		
uptive fevers	94.9	68.9	26.0		1.27	1.82		0.55	1.3	2.7
darial ,,	1.7	97.3		95.6	3	2.18		2.18		2.2
her ,,	4.2	18.0		14.8		0.55		0.55	1.0	3.0
berculosis	2.3	3.1	4.	0.8	0.98	0.73	0.25		43.2	23.5
bility, &c her general	18.0	38.4	••	20.4	0.98	2.36	••	1.38	5.4	6.1
diseases	27.3	17.8	10.5		1.73	3.45		1.72	6.3	19.9
vous system	9.3	10.0		0.7	2 80	5.82		3.02	30.4	58.2
espiratory ,,	134.9	68.0	66.9		4.46	6.91		2.45	3.3	10.2
igestive "	103.5	96.2	7.3		3.71	13.09		9.38	3.2	13.4
ll diseases	507.3	527.1		19.8	18.31	41.09		22.78	3.6	7.8

But even including the great class of malarial fevers which, in the comparison, are shown to be almost exclusively present in the Indian statistics, and cause 97 admissions per 1,000 of the children borne on the strength of the European army in India, the admission rate for children in India is only 19.8 per 1,000 in excess of that of the United Kingdom; and consequently, apart from malaria, it is clear that the same class of children suffer more frequently from illness at home than their brothers and sisters brought up in India. This is in accordance with common experience, so that up to a certain age Europeans do not hesitate to keep their children in India.

From this table it is evident that, apart from malaria, the higher admission-rate in this country is due chiefly to two classes of diseases—namely, the eruptive fevers and diseases of the respiratory apparatus.

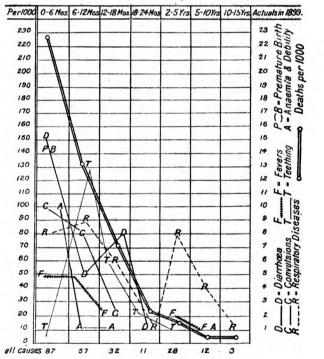
# ERUPTIVE FEVERS.

In the case of the eruptive fevers the difference amounts to 26 per 1,000. Of these exanthems, measles was almost as prevalent in 1899 in India as in the United Kingdom (60 against 63 per 1,000) but was relatively more fatal, with a case-mortality of 2.4 per cent. against 0.9. The idea that measles is a milder disease in India than at home is not therefore supported by these figures. Rubella was more prevalent at home in the proportion of 5.6 to 3.6 per 1,000, and scarlet fever in that of 14 to 2.3; and in this respect 1899 was an exceptional year in India, where usually scarlet fever is a rare occurrence. Chickenpox was also more prevalent at home.

### RESPIRATORY DISEASES.

It is in diseases of the chest, however, that Indian children have the greatest advantage. These diseases are just twice as frequent at home as in India. At home bronchial affections gave 126.2 admissions per 1,000, and in India only 58.2. In India, however, the case-mortality was 5 per cent., against 2 per cent. at home. In India both the admission-rate and casemortality of pneumonia were higher than at home, the figures being 4.9 per 1,000 and 44.4 per cent., against 3.8 and 32.9 at home respectively. This appalling mortality of pneumonia in children in India, amounting to nearly one-half of the cases, bears out what I have long held-namely, that pneumonia is by far the most formidable disease, next to cholera, which we have to treat in India, not only in children, but also in natives. Among European adults the case-mortality from pneumonia is about 12 to 14 per cent. both at home and in India. I firmly believe that a great part of the death-rate in India attributed to fever is, in fact, due to pneumonia in respect of the native population, with whom every illness accompanied by fever is "bokhar," and is returned as such. This is an observation which I have verified many times, not only clinically, but on the post-morten table.

DEATHS per 1000 according to AGE, 1899



DIGESTIVE SYSTEM.

It comes somewhat as a surprise to find that the generally-expressed opinion that whereas the brunt of disease is borne by the chest in cold climates, it falls on the digestive organs in the tropics, is not true, comparatively speaking. As a matter of fact, at least among soldiers and their children, diseases of the digestive system are rather more prevalent at home than in India. At home in 1898 they caused the

admission of 114 men per 1,000, and in India 110 per 1,000, and as regards children they caused 103.5 admissions at home, and only 96.2 in India in the same year, which was in no way an exceptional one.

It is not of their frequency but of their gravity that the received opinion is true, the case-mortality from these diseases being just four times greater in India than at home among children, and nearly six times greater among adults. (N.B.—The diseases I am now speaking of are exclusive of dysentery and cholera.)

### DIARRHEA.

Analysing these diseases of the digestive system we find that diarrhœa gave 39 per 1,000 admissions among children in India and 35 at home, but the case-mortality was 13.5 per cent. in India and only 4.2 at home. Diseases of the mouth and throat caused 35.2 admissions per 1,000 at home and only 14.5 in India. Dentition caused 22 admissions in India against 6.7 at home, and the case-mortality was 12.2 per cent. in India and 5 per cent. at home. Enteritis caused twice as many admissions in India and the case-mortality was double. From these figures it is clear, however, that, excluding diseases of the mouth and throat, which are more prevalent at home than in India, diseases of the stomach and bowels are not only, on the whole, more frequent, but they are, at the same time, nearly four times more fatal in India than at home.

### DYSENTERY.

If among these diseases we include the sickness and mortality due to dysentery we find that the admission-rate for that disease was 13 per 1,000 in India against 0·3 in the United Kingdom, and the death-rate 1·27 per 1,000 in India against nil. The case-mortality from dysentery in India is 9·8 per cent. among children.

I may here say that the question of the diagnosis of dysentery is not the simple one which it is generally supposed to be, and it is one which would well repay careful inquiry on a scientific basis. The classical symptoms, the tormina, the tenesmus, the bloody mucus in the stools, are not sufficient to warrant the diagnosis of dysentery. In nine cases out of ten in which these symptoms occur they are not caused by true dysentery, but by a rectal catarrh or proctitis of a very transient character, which will subside rapidly if you put the patient in bed, and a poultice on his abdomen, and put him on peptonised milk and a little Dover's powder.

These are the cases which made the name and fame of ipecacuanha, as they are now making the name and fame of the saline treatment of dysentery. I observed and recorded a great many cases of this kind of so-called dysentery, and my record has never been beaten; I think it was, on an average, recovery in two and a-half days. Ipecacuanha does the same in three days, and the saline treatment, I believe, in about the same time; but it is not dysentery, and it can be cured without either ipecacuanha or salines, especially in children.

### LIVER ABSCESS.

It is natural to pass from the consideration of dysentery to that of hepatic abscess, and the point

which strikes us, as it has struck every one who has given any thought to the subject, is the entire absence of the mention of the latter disease among those of children in India. In the year 1899, while there were 153 cases of liver abscess among the European soldiers in India with 85 deaths, there was not one among the children. The connection between certain forms of dysentery and abscess of the liver is well established and is not to be denied, and the only explanation of the immunity of children from hepatic abscess is that the kind of dysentery they suffer from is not that which is so frequently followed by liver abscess in adults. It is true that dysentery is just twice as common among European soldiers in India as it is among their children (25.4 to 12.9 per 1,000), but that does not account for the immunity of children, especially as the severity of the disease is much greater in children than adults, the case mortality being 9-8 per cent. among children and only 2.4 among adults. I never in the course of my six-and-twenty years of service in India diagnosed or heard of an abscess in the liver of a child.

### OTHER GENERAL DISEASES.

The only other group of diseases in which the admission-rate is higher at home than in India is that of "other general diseases." The principal diseases included under this head are whooping-cough, mumps, anæmia, and immaturity at birth. They do not seem to call for special remark here, are included. except that there are included among them in India five cases of rickets, with two deaths. I do not know whether those among you with Indian experience will agree with me when I say that rickets is much less frequently met with in India than in this country, and more especially among native children in normal years. Those who have had to do with the famines of recent years will probably have a very different experience to relate; but, speaking of normal conditions, I do not think that the out patient departments of Indian hospitals are filled with rickety children as they are, say, in London, where it is probably no exaggeration to say that 20 per cent. of the children seeking relief are more or less the subjects of this disease. But while the admission-rate for these diseases is lower, the death-rate is just double, and the case-mortality three times greater in India than at home.

With regard to rickets, the habit of nursing their children may account for its comparative infrequency among natives, and the absence of destitution and absolute privation among Europeans may do the same for them.

# FEBRICULA AND SIMPLE CONTINUED FEVER.

Turning to diseases which are more frequent among European children in India than at home, after malarial fevers already mentioned, we come first to fevers other than the eruptive, and under this head we have to deal almost exclusively with febricula and simple continued fever. The sickness recorded under this head varies greatly from year to year. Thus, while it was 18.0 per 1,000 in 1899, it was 32.4 in 1898. The case-mortality was, however, the same in both years—namely, 3 per cent. We may say at

once that this mortality took place entirely among the cases of simple continued fever, for febricula is not a fatal disease; and this raises the question as to the essential nature of simple continued fever. It is a name given to continued fever of a good many days' duration, which may extend to twenty-one days, but which does not present the usual clinical features of enteric fever, and on this ground practitioners have hitherto hesitated to give it this graver name, especially as in the majority of such cases the duration of the fever does not exceed a fortnight, and there is no eruption and no characteristic diarrhœa, and enlargement of the spleen, if it exists, may be due to a previous or concomitant malarial infection. Formerly, when we were obliged to rely on the clinical symptoms alone, this hesitation was justifiable; and, looking to our ignorance regarding infection by organisms morphologically related to Eberth's bacillus, it was dictated by the true scientific spirit; but now we possess an additional method of diagnosing these doubtful cases in Widal's reaction, and recent observations, especially in South Africa, show that 75 per cent. of cases of so-called simple continued fever give the serum reaction which is characteristic of typhoid

Now the case-mortality of typhoid fever in children in India is 7.4 per cent., and as there were 3 deaths returned as from "simple continued fever," it follows that these fatal cases probably represent 40 cases of typhoid fever which were returned under our present heading, but which ought to have been included under that of enteric fever. Instead of the returns showing for 1899 only 27 admissions and 2 deaths from enteric fever among children in India, it probably would be nearer the truth to say that there were 67 cases and 5 deaths. This would leave 59 cases of febricula and simple continued fever which were not enteric, and giving no mortality, instead of 99 cases with 3 deaths, as shown in the returns. Similar remarks might with propriety be made with reference to remittent fever.

The application of Widal's serum reaction test is so easy, and the means of putting it into use have been so multiplied of late years in India, that there is now hardly any excuse for not seeking its aid in the diagnosis of all doubtful continued fevers. The proportion of cases of true typhoid fever in which the reaction does not take place at some period of the disease, and its occurrence in other diseases than typhoid, is so small as to be almost a negligible consideration.

I am here speaking only of Europeans, and this is hardly the place to enter into the question of the diagnostic value of Widal's reaction in the febrile diseases of natives of India. I think it will be found that a very large percentage of natives of India who are not suffering from any febrile condition, and who have never, or certainly not for many years, suffered from any fever which could be by any possibility diagnosed as enteric fever, give the reaction in a perfectly characteristic way. I have myself found it present in dilutions of 1 in 50 within half an hour in three out of six healthy natives of India living in London during the present year. The doubt which this observation throws on conclusions founded on the serum test in the diagnosis of febrile states in natives of India is sufficiently obvious.

I may add that in four cases convalescent from what was returned as "simple continued fever" in South Africa, I have found Widal's reaction in three, and this seems the usual proportion. In the fourth case, which did not give the reaction, the whole course of the case and the character of the sequelæ pointed quite clearly to enteric as having constituted the real cause of the disability.

### TUBERCLE.

The question of tuberculous disease among European children in India has already been discussed by me in my report on the Congress on Tuberculosis at Berlin in 1899, which will be found reproduced in the Annual Report of the Sanitary Commissioner with the Government of India for 1898.

The statistics of the civil populations are not full enough or accurate enough to give us any information on this point, but there is a very general consensus of opinion among Indian medical authorities that it is much less frequent among children in India than it is at home.

"Taking strumous enlargement of the cervical glands as the commonest and most obvious form of tuberculous infection in children, Chevers states that he never saw a case in a native of the plains of India. In the orphan asylums of Calcutta, with an aggregate strength of 561 Europeans, East Indian, and Armenian children, and between 400 and 500 admissions to hospital per annum, there were, according to Webb, who was in charge of them for many years, no entries for scrofula."

Tabes mesenterica is certainly very rare among the civil population. Chevers says he never admitted a case to hospital. Moorehead does not mention it as occurring in the large Byculla schools at Bombay, neither do Webb and Fayrer as regards the Calcutta schools, and the records of the Madras orphan asylums are also silent with regard to it. I cannot myself recall more than a few doubtful cases.

It was at one time, however, apparently very prevalent among the children of European soldiers serving in India, as the following figures show:—

		Ad	Deaths.		
1880	 	 	56		26
1881	 	 	43		24
1882	 	 	31		15
1883	 	 	32		21

Tabes mesenterica has become much less frequent of late years, and in 1896 there were only two admissions and no deaths in a strength of 5,790 European children," and in 1899, 8 cases and 4 deaths. The other tuberculous diseases for which there were admissions during the latter year were scrofulous glands 4, and tubercle of the lung 2. The 4 fatal cases (all from tubercle of the intestine) occurred in children, 2 under six months, 1 between six and twelve months, and 1 between two and five years; 3 of the 4 deaths were in children under one year.

# TUBERCULOUS MENINGITIS AND HYDROCEPHALUS.

Tuberculous meningitis is met with from time to time among European children in India, but tuberculous disease of the hip-joint is "certainly unusual in India" (Birch). Chevers, in his long experience in India, saw only one solitary instance in a European girl—I never saw one myself. Hydrocephalus is by no means rare.

### PULMONARY PHTHISIS.

Of 15,116 deaths among the civil population of the North-West Provinces in 1897, verified by the medical staff and a professional agency, only 40 deaths from tubercle of the lung were so certified, and of these only 6 were children, all under the age of 18 months. This offers a great contrast to the statistics of European countries. There were 1,324 deaths from phthis in England and Wales in 1899 in children under 5 years of age, constituting 3.1 per cent. of the total mortality from that disease, and where the percentage of phthisis to total mortality is 7.3 against 0.26 in the North-West Provinces of India, according to these statistics. Thus while the admission-rate for all tuberculous disease appears to be higher among European children in India, the death-rate and case-mortality are both lower. Here, however, the habit of invaliding to England may interfere with the true relationship of the figures to the facts. This remark does not invalidate the figures given above for the native population of the North-West Provinces.

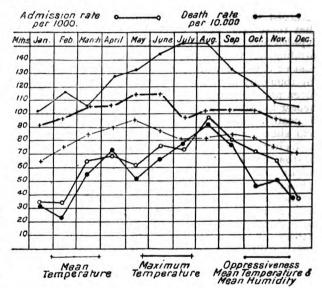
# ANEMIA, DEBILITY, AND PREMATURE BIRTHS.

I have reserved to the last the diseases included under anæmia, debility, and immature birth, because they may be regarded as the master-key to the explanation of the figures we have considered under the different heads. These diseases gave 20 per 1,000 more admissions among children in India than in the United Kingdom—38·3 per 1,000 against 18·3 or fully twice as many. The death-rate was also  $2\frac{1}{2}$  times greater, while the case-mortality was only greater in the proportion of 6 to 5. It is to be noted that every one of the children born prematurely died—14 in number.

# GENERAL CONCLUSIONS.

The lessons we learn from these, I fear somewhat tiresome, figures, is that while European children in India enjoy a certain relative degree of immunity from some of the diseases prevalent in childhood, especially as regards respiratory diseases and the eruptive fevers, "other general diseases," and, to a slight extent, diseases of the digestive system, their death-rate and the case-mortality from all diseases, with the solitary exception of tubercle, is higher, in fact, more than double those prevailing in the United Kingdom among the same class. The difference in case-mortality is not in any one disease or class of disease, but is common to all, though it is most marked in those of the digestive system, the respiratory and nervous systems, and in "other general diseases." The key to this high death-rate is to be sought for, not in a greater virulence of any or all of the diseases included in these groups, but in the debility produced by an enervating and exhausting climate, which saps the strength and renders the struggle for life so difficult and so pathetic in these little sufferers. Who has not sat by the bedside of a child suffering from pneumonia, we will say, and which has to fight not only with a grave and vital disease, but has to struggle at the same time against the exhausting effects of the high temperature

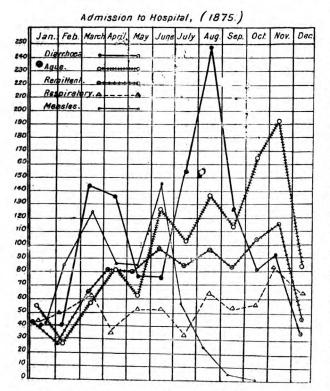
of an atmosphere saturated with moisture, with the sleeplessness caused by prickly heat and mosquitoes, and wondered not that the case-mortality of the disease was 44 per cent., but that it was not more, and so with all the febrile, inflammatory, and exhausting diseases of children in India. So much impressed was I with this physical exhaustion, the effect of climate, as the principal cause of the high mortality and suffering in illness, especially among children in India, that when the General Hospital in Calcutta was to be rebuilt, I went earnestly into the question of cooled hospitals in India, where the internal temperature should never be allowed to rise above 75°. Lord Elgin took up the idea with enthusiasm, but it was found that the expense of such a scheme was so enormous as to be prohibitive. I do not altogether, however, despair of some such scheme being some day feasible on a small scale. The great cause of expense in such a proposal is the difficulty of removing the moisture before admitting the cooled air to the wards. How closely the admission-rates and deathrates are related to the heat and moisture of the atmosphere is clearly seen in the following table, which shows graphically the admissions per 1,000 and the death-rate per 10,000 for each month of the



In this diagram I have also traced in its upper part three lines which represent in order from below upwards the mean temperature, the maximum temperature, and the "oppressiveness" of each month of the year. I have chosen for the purpose the meteorological returns for Nagpur, which may be regarded as the central point of India, and to represent generally the course of temperature, &c., in an inland province. I have plotted out the curves for other stations, but though they differ from each other in detail, they have the same general character, which is enough for my present purpose. It is obvious that the sick-rate and death-rate curves are not closely related to the mean temperature. This reaches its maximum in May, and declines through June, July, and August, whereas the sick-rate, and more especially the death-rate, rise

from May through June and July to their maximum in August. The fierceness of the maximum temperature is reached in May and June, and falls nearly 20° in July and August. With the fall of maximum temperature in July there is a slight diminution in the sick-rate, but an increase in the death-rate, and both rise again in August. It is in the upper line that the parallelism is most marked at this season. This is the curve of "oppressiveness," and is obtained by adding the mean humidity to the mean temperature, and it may be taken as representing the stress and exhaustion caused by "climate." It rises steadily from March, and reaches its maximum in July and August, corresponding with the maximum of sickness and mortality, and as it declines steadily towards the end of the year, the sick-rate and death-rate decline with it. The comparatively high curves of March and April correspond with the sudden rise of maximum temperature in March and April, more marked in other stations than in Nagpur, as, for instance, in Lucknow, where the difference between the maxima in February and March is 30°, and is accompanied by a rise in every class of disease. The dip in May is difficult to explain on meteorological grounds, but the rise in the death-rate in November is due to malarial fevers and respiratory diseases, due the former to the prevalence of mosquitoes, and the latter to the onset of cold nights.

In the following diagram I have traced the admissions per month (1875) for ague, remittent and con-



tinued fevers (together), diarrhea and measles, as showing how they respectively affect the health of European children in India; and from this it will be seen that the cause of the bad pre-eminence in the admission-rate of August is due to diarrhea, and that this disease to a large extent determines the character of the curve of the admission-rate from month to month, as shown in the preceding diagram. It shows at a glance the prevalence of each of these diseases during the successive months, and does not seem to require explanation.

# FILARIAL ABSCESS.

By J. Preston Maxwell, M.B., B.S., F.R.C.S. China.

ABSCESS of the scrotum is a disease by no means common in England, even granting the inclusion of tuberculous abscess connected with the epididymis and testicle; and it was with some surprise and not a little incredulity that I found myself, soon after my arrival in China, confronted by a patient whose scrotum, swollen to the size of a large feetal head, appeared to be little more than a bag of pus.

His history was a curious, but at the same time typical, one, although I did not know it to be such at the time I mention. Fifteen days previously, while at work, he had been seized by a violent rigor, which lasted about ten minutes, and passed into fever, which had been persistent since. He was cognisant of no previous illness, and denied any attacks of lymph fever, stating he had been a strong man all his life. He was aged 42. He refused to come into hospital, and I refused to operate in his dirty hovel.

Eventually part of the scrotum sloughed, and

Eventually part of the scrotum sloughed, and after a long illness the man recovered. His subsequent history is reported in the appended table of cases (No. 1).

After I had seen and operated upon one or two of the cases, I determined to try and find out the cause. Gonorrhea could be easily excluded, as not more than 30 per cent. of the patients confessed to having had it. None of them had any sign of it at the time of their illness, none had stricture of the urethra, and the ochitis present was slight, and in many cases absent. And besides the fact of the abscesses being mostly outside the testicle and seminal tract, the further knowledge that Morris, in his "Diseases of the Urinary and Generative System," did not mention such an affection, put the same, in my opinion, out of court. Injury with the suppuration of a consequent hæmatoma next occurred to me as a possible cause. But in every case in my list injury could be absolutely

Infection by the bite of some insect could also be excluded. I was fully aware that Manson, in his "Tropical Diseases," mentioned abscess as a manifestation of filarial disease, but I was not aware that it might be the first and only manifestation. However, I began to systematically examine the blood of the patients, who suffered in this way, with the result that everyone was found to be suffering from filarial sanguinis hominis nocturna, and in considering the subject of filarial abscess every doubtful case, that is to say, every case in which I could not find the parasite or obtain a definite history of lymph fever has been excluded. Only about one in ten of abscess I

have judged to be filarial in origin have been excluded owing to this test, and not one of these were abscesses of the scrotum. To turn to the general question of filarial abscess, its incidence is naturally only limited by the incidence of infection with the filarial parasite, and it may occur either as an incident in the course of filarial disease, or as the first symptom and sign of the same. In my experience it may occur in any situation where there is loose connective tissue, rich in lymphatics, and for this reason the majority of abscesses outside the scrotum are in the vicinity of the great vessels, and the abscess does not always form in the situation where the inflammatory focus starts. In two of the cases in which I have opened a filarial abscess over the lower end of Hunter's canal, I have good evidence that the inflammatory focus was first situated in Scarpa's triangle. Both the patients themselves and my own students who saw the cases before I did, are perfectly clear on this point; and this evidence is important as bearing on the question of pathology.

Previous observers have opened these abscesses and found the dead body of a parent filarial worm, and have justly surmised that some at least of these abscesses were the result of the death of the parent worm

In one of my cases I found portions of the body of a parent worm, but in none of the others could I find anything of the kind, although a most thorough search was carried out. In some of these, however, the abscess was of some standing, rendering the absence of a dead parent worm insufficient proof. I regret to say that lack of apparatus has up to the present prevented me from a thorough bacteriological examination of these abscesses. On two occasions I inoculated broth cultures without any result, and in some there are undoubtedly ordinary pyogenic organisms, but these are cases which have been neglected, and in which the skin is about to slough.

I am inclined to think that some are due to a cause other than the death of a parent worm. I was fortunate enough to be able to observe the whole process in a patient, who was in hospital for a trivial affection. Within a day or two he had an attack of filarial lymphangitis of the cord on both sides of the scrotum; the one side came to suppuration, the other did not. Both, at the outset, presented exactly the same appearances, the inflammatory process on the one side being apparently much the same as on the other; and on two other occasions by promptly putting the part at rest and applying cold, I have been able to abort the inflammatory process.

But as a rule a sharp local attack leads to the formation of pus. And there is another fact which has to be taken into account in considering the pathology. As I shall hereafter show, some of these abscesses in the scrotum are suppurating hydroceles. In this case it is difficult to see where death of a parent worm can come in, as I believe they have never been found inside hydroceles. I am inclined to think that the majority of these are due to a local cause, and probably connected with the blocking of lymphatic vessels. I have no evidence to offer in support of this view save the fact that in some of these cases the abscess is the first manifestation of an

affection which ends in elephantiasis of the scrotum or affected limb. In others it certainly does not, but possibly this is due to the fact that a lesser area of the lymphatic system has been interfered with.

Passing from the pathology of the disease to its clinical form and diagnostic points, I would provisionally classify these abscesses as follows: Filarial abscess (a) of the scrotum—(1) suppurating hydrocele; (2) abscess of the cord; (3) abscess below the testicle; (b) of the limbs; (c) intraabdominal or intrathoracic.

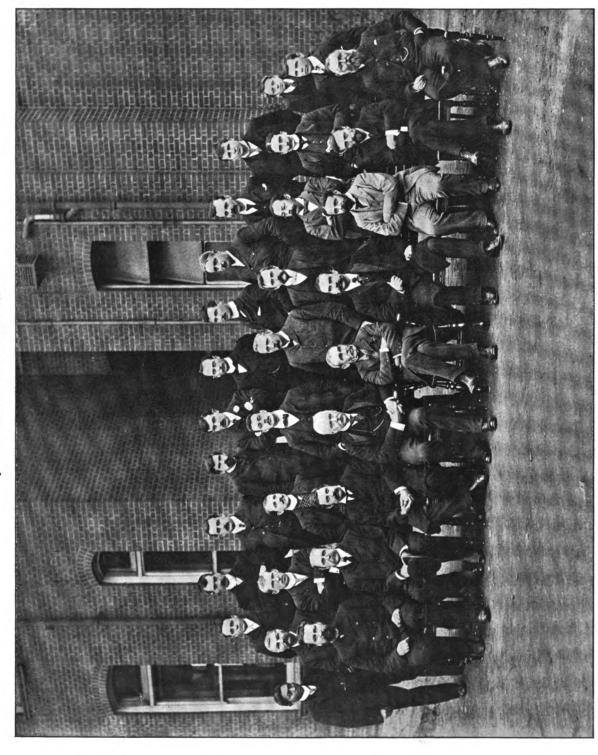
Concerning the cases contained in division (a) the division may seem at first sight to be arbitrary and unnecessary. A further consideration will show that this is not so. Commencing in the way which is common to all abscesses, they follow different courses, and have to be treated in a different way.

- (1) Suppurating Hydrocele.—The patient has generally got a hydrocele of moderate or large size already present. At the commencement of the attack this swells to nearly double its previous size, and becomes intensely tender and painful. In a day or so its contents are purulent, and if left to itself the wall and skin over it will slough and the contents discharge. A long convalescence may ensue, as the hole thus formed may be very large. Tapping is only of use in the early stage, and when the contents have become purulent, incision and drainage should be adopted. Care should be taken to have the opening at the most dependent past, and the thick layer of lymph lining the hydrocele sac should be removed. Free bleeding will ensue, and the cavity may have to be packed for twenty-four hours with gauze. Healing is usually rapid, but care has to be taken not to allow the external opening to close too soon. I need hardly say that strict antiseptic precautions should be observed.
- (2) Abscess of the Cord.—This is the most serious of the forms of abscess affecting the scrotum by reason of the liability of the inflammatory process to spread up the cord. In several cases I could trace the cord as a great hard rope as far up as the internal ring; moreover, it was intensely tender. Whether in these cases there is any associated inflammation of the peritoneal surface or not, I have no positive proof, but the fixity and tenderness of that part of the abdominal wall is suggestive, and it is well known that an acute septic infection of the cord may spread inwards and set up an acute septic peritonitis. But although the inflammation in these filarial cases may spread up the cord, the actual abscess in all the cases I have seen is outside the external abdominal ring. It is also the most serious of the forms of abscess affecting the scrotum as regards treatment. The abscess is apt to have loculi and pockets which interfere with
- the free drainage, and consequently with rapid healing.
  (3) Abscess below the Testicle.—This is the most simple of the filarial abscesses occurring in the scrotum. Drainage is easy and healing is rapid, a few days sufficing to end the affection, which does not extend far and is not of large size. It was from one of these I obtained the portions of a parent worm, and I should not be surprised if all the abscesses in this situation are due to a similar cause.

Turning now to (b) Filarial Abscess in the Limbs.

# LONDON SCHOOL OF TROPICAL MEDICINE.

7th Session, Oct.-Dec., 1901.



T. E. Rice, J. Ritchie Brown, F. G. Hopkins, C. M. Heanley, P. T. Manson. A. L. N. Maclean C. S. Clark, J. P. Tullock, T. V. Campbell, C. E. S. Watson,
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 A. P. Tjellström, Mr. Michelli, Prof. Hewlett (Leo.), Dr. Manson (Lec.), Dep. Inspec.—General Bentham, R. N. Dr. Sambon (Lec.), C. Domicle (Med. Sup.), A. N. de Gruchy, E. Symonds, Abstentie.—J. C. Maxwell, B. Metchile, E. A. Parsons, E. G. Long, Prof. Ludwig Aschoff.

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FILARIAL ABSCESS: STATISTICS OF CASES, 1899-1901.

No.		Initial	a	ex nd ge	Occupatio	n	Situation	Pr	evious Hist	Filaria tory	ıl		Microscop	ic Resul	ts	Subsequent History
1			M.	, 42	Shop		Scrotal abscess	. Nor	16			no	octurna.	inis ho Many	Second	Recovery, but subsequent attacks of ele- phantoid fever
3		S. S.			Shop Shop								Many Many	::		Recovery. See No. 3 Recovery. The perineal abscess was separated by some interval from the other, and was due to another definite attack
					None Fields					of lymp			Many Many	::		Recovery. Subsequent history unknown Recovery. Subsequent attacks of ele- phantoid fever
6	C.	C.	М.	, 33	Fields	••	Suppurating hydrocele .					Do.	Two in	three	slides	Recovery very slow. Inflammation had spread to cord before admission, but there was no abscess outside the hy- drocele
7	J.		М.	, 40	Fields	••	Abscess of cord	. Nor	ie			Do.	Many			Recovery. No subsequent attacks in 18 months, but commencing elephanti- asis scroti
8	T.	I.	M.	, 51	None	٠.	Abscess of cord and sup- purating hydrocele	- Nor	1e			Do.	Many	• •		Recovery. No subsequent attacks in past year
9	K.	. U	. M.	, 25	Fields	٠.				history		Do.	Three i	in two	slides	Recovery rapid. Subsequent history unknown
10	0.	т.	M.	, 40	Fields	٠.	Abscess below testicle .	. Atte	acks o	of lym	ph 3	Do.	Many			Recovery. Subsequent history unknown
					Fields Fields		Suppurating hydrocele . Suppuration below testicle	. Nor	ie		1	Do. Do.	A few One in	two sl	ides	Recovery. Subsequent history unknown Recovery. In this case portions of a parent worm were obtained
13	C.	I.	M.	, 29	Fields	٠.	Suppuration below testicle		vious ever	lymph	h i	Do.	Many			Recovery. Subsequent attacks of ele- phantoid fever
14	K	. K	. М.	, 36	Fields		Abscess of cord			histo	ry	Do.	Many	••		Recovery. Subsequent attacks of ele- phantoid fever
15	Н		. М.	, 45	Preacher		Abscess of cord	. Nor	18	•	•••	Do.	Many	••	•	Recovery. Subsequent attacks of ele- phantoid fever, and commencing ele- phantiasis scroti
16	J.		. M.	, 29	Fields		Abscess of cord		vious ever	lympl	h i	Do.	Many			Recovery. Subsequent attacks of ele- phantoid fever
17	E		. M.	, 28	Fields		Popliteal abscess	. Nor				Do.	Many	••		Recovery. Sinus still persisting, and commencing elephantiasis of leg
18	J.		. F.	43	Housewor	rk	Popliteal abscess	. Nor	1e			Do.	Many			Recovery. Small sinus persists. No further attacks in 6 months
19	0		. М.	, 19	Fields	٠.	Suppuration in thigh .	. Nor	ne	••		Do.	A few			Recovery. Commencing elephantiasis of leg
20	K	. ,	. M.	, 41	Fields		Suppuration in thigh .	. Pre	vious	attac	ks	Do.	One			Recovery. No attacks since, but history
21	S.		. M.	, 48	Fields		Axillary abscess	. Nor	1e			Do.	Many			too recent—a week or two Recovery. No subsequent attacks in a
22	J.	١.	. М.	, 50	None	•	Retroperitoneal abscess .	. Pre	vious	attacl	ks	Do.	None			year (?) Discharged himself, very low at the time. Abscess opened at border of erector spine
23	A		. М.	, 48	Shop	••	Ilio-pelvic abscess .	. Pre	vious	attacl	ks	Do.	None		٠.,	Simulated appendicitis. Still under treatment, will almost certainly re- cover

As I have previously stated these occur in situations rich in lymphatic tissue, and generally in the immediate neighbourhood of the large vessels; and it is not an uncommon thing, on opening one of these abscesses, to be able to put one's finger on, or even around, the main vessel of the limb. It is one proof of the low form of inflammatory process that I have never seen one of these vessels give the slightest trouble from secondary hæmorrhage due to softening of the vessel wall and subsequent rupture.

Of these abscesses, those in relation to the femoral artery give the most trouble. This is partly on account of their deep connections and the difficulty of thorough drainage. And in some of them the lymphatic system seems to be so disorganised that they pass directly into the commencement of an attack of elephantiasis of the limb. Consequently one must be guarded in one's prognosis of the ultimate result of treatment.

The treatment consists in free drainage, and owing to the difficulty of draining the deeper portions, it is well to make free openings under chloroform and insert large drainage tubes. Troublesome contracture of the lower limb may occur during the healing of large abscesses, especially those involving the popliteal space, and should be avoided by splinting the limb, and using massage as soon as possible. But among my Chinese patients who are absolutely intolerant of restraint, and over whom one has not the same command as at home, I am sorry to say troublesome contracture is by no means unknown.

(c) Intraabdominal and Intrathoracic Abscess.—Of the latter form I have no experience, but of the former I have met with two cases.

In each case the illness coincided with the cessation of lymph fever attacks, and each case was desperately ill when admitted to hospital. Both had commenced in the way I shall hereafter describe as typical. In the one case I found deep fluctuation in the left lumbar region and opened an abscess under chloroform, which was post-peritoneal and apparently had no connection with any of the large abdominal organs. The urine contained the faintest traces of albumen, but neither formerly or at the time of operation were there any symptoms pointing to disease of that organ. This case left hospital by his own request, and was still desperately ill. The abscess was draining well, but as he had been ill two and a half months and was very weak, his recovery was far from certain, and the case is too recent for me to have had opportunity of learning the result. The second came into hospital looking like a typical case of appendicitis. He also

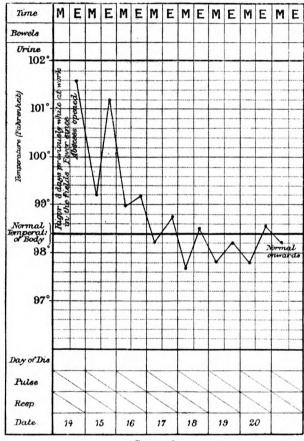


CHART A.

was very ill and had been so for a month and a half. The abscess proved to be extraperitoneal and extended both into the iliac fossa and down into the pelvis. In my opinion it began in the loose tissue about the iliac vessels, and the fact that the disease began with a rigor, and immediate flexion of the right thigh on the abdomen to an extent I have never seen in an uncomplicated case of appendicitis gives some colour to this supposition. This case is still under treatment and the abscess cavity shows no great readiness to heal up, while the patient is extremely weak, so that it is difficult to say how this case will end. His bowels were regular and natural at the time of the attack.

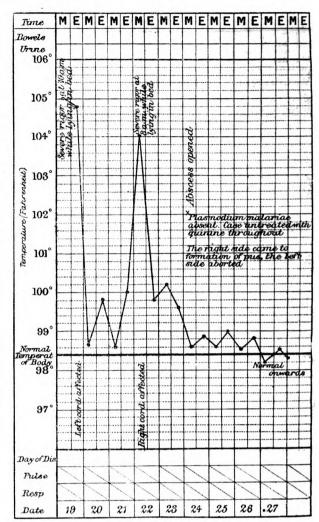


CHART B.

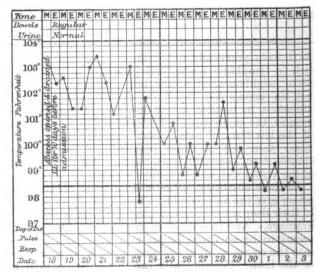


CHART C.

I believe that Manson's advice on the subject of these abscesses is sound: "Deep-seated pain in the thorax or abdomen with inflammatory fever followed by hectic fever and a diminution in the number of embryo filaria in, or their entire disappearance from the peripheral blood, should, in such circumstances, suggest a diagnosis of filarial abscess and indicate exploration, and if feasible, active surgical interference.'

Finally, we must discuss the onset of this malady and its typical temperature. Chart A is what I judge to be a typical temperature chart of the disease.

Rising rapidly with a rigor, which may occur while the man is at work in the fields, or cutting wood, or even lying in bed, it remains high for one to three days, and then descends by lysis, provided an unopened abscess is not left. On the other hand, if the patient be under favourable conditions and it is possible to abort the attack, the temperature may descend very rapidly. (See Chart B.)

In neglected cases and cases which do not run a proper course owing to insufficient drainage or wide inflammatory focus, the temperature may assume a septic type. (See Chart C.)

In criticism it may be urged that this temperature is the result of the plasmodium malariæ complicating the filarial attack. I reply, I would rely upon the following facts, first, that in many of the cases the blood was carefully examined by me for plasmodium malariæ with a negative result; secondly, that it is quite possible for the fever due to the presence of filaria sanguinis hominis and active malarial attacks to run concurrently, but in these cases both the diseases are clinically and microscopically distinct, and, moreover, the patient, as I have proved in two instances, has been right in his statement that one night he had a filarial attack and the next an ordinary quartan paroxysm. I may add that in no case of filarial abscess of the limbs was there any focus of infection to be discovered on the surface of the limb.

PERSISTENCE OF YELLOW FEVER INFECTION ON Shipboard.—A steamer arrived on September 21st at Santiago, six days out from Jacksonville, with three cases of yellow fever on board. The vessel left Progreso six weeks previously, and arrived at New York with one case of fever on board. The man died in the harbour, and the ship was disinfected. The steamer left New York in apparently clean condition, but the captain's wife was taken ill soon after leaving this port and died while on the way from New York to Jacksonville. One man died the day the ship arrived at Santiago, and the autopsy showed plainly that he had been suffering from yellow fever. The crew was removed to the yellow fever hospital, which is situated on an island two miles from the city. The steamer was fumigated and held in quarantine in the lower bay, and in the course of a few days eight new cases of the disease developed among the crew .-Medical Record, September 28th, 1901.

THE DISCOVERY OF THE BACILLUS OF LEPROSY .-Dr. H. P. Lie, the present Director of the Leprosy Hospitals of Bergen, contributes an interesting biographical sketch of Dr. Gerhard Henrik Armauer Hansen to Lepra. Dr. Hansen was born in Bergen in 1841, and received his early education in the Cathedral College of that town. After passing his medical examinations, he became a resident in the Rigshospital, of Christiania, and later spent some time as medical officer to the great Lofoten fisheries. In 1868 he became Assistant Medical Officer to the Bergen Leper Hospital, of which Dr. C. Danielssen was director. It was under the influence of this enthusiastic teacher and acute observer that Armauer Hansen began his life-long study of leprosy. His first investigation was to work out the significance of the so-called globi, or leprous cells, of Virchow. These bodies had been already referred to in 1840 by Danielssen, who thought they were characteristic of the disease. This idea he afterwards gave up, and came to the conclusion they were the results of an involution process, that is, fatty degeneration. Hansen was not satisfied with the latter explanation; he thought that Danielssen's first idea was more likely the right one. This led him to investigate the matter, and in 1869 he published his results in a Norwegian periodical. At this time Hansen spent a year at various universities, but on his return to Norway he again applied himself to the difficulties which surrounded the etiology of leprosy. Various views were held at that time on this point. result of his observations and investigations, he published in 1872 an important paper, which gave rise to much discussion in Norwegian medical circles. His researches pointed to the contagious and specific nature of the malady. The Medical Society of Christiania voted a sum of money for him to continue his research. In the course of his journeyings through the country he came across instances of the disease which were more readily explained by contagion than by any other theory. An account of his additional investigation was published in the Norsk Magazin for Lægevidenskaben. Unfortunately, in 1874, this important contribution to the subject was but little known outside of Norway. His views confirmed those of Drognat-Landré, who had worked at leprosy in Surinam, and published a book entitled "La Contagion seule cause de la lèpre" (Paris, 1869). This led Hansen to reinvestigate the peculiar bodies (globi-brown corpuscles) previously referred to, for he held that if the disease is contagious there must be some specific virus at work. His labours were rewarded by the discovery, in unstained preparations, of bacilli. These were ultimately stained, and are what we know them to be, the bacilli of leprosy. His discovery, be it noted, was made in 1873, that is about ten years before the bacillus tuberculosis was made known to the world by Koch. For years Hansen has repeatedly tried to cultivate and inoculate the bacillus lepræ, which is also deservedly known as Hansen's bacillus, but up to the present fruitlessly. British Medical Journal.

# Business Motices.

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THE

# Journal of Tropical Medicine

DECEMBER 2, 1901.

### SERVICE IN THE CROWN MEDICAL COLONIES AND PROTECTORATE.

WE offer no apology for again referring to this all-important subject. The question cannot be allowed to rest until the several units by which the medical service of the colonies is manned and worked are brought together into a single service, and directed from a common centre. Unification must be the sole aim at present, and every effort must be made in that direction before other important issues are touched upon. Every medical officer in the service of the Crown Colonies and Protectorate has some advice to give in the direction of improvement, but until the service has a sure base to start from, alterations here and there are mere patchwork and tinkering to no purpose.

Questions of allowances, pay, pension, invaliding, leave, finding substitutes, &c., are pressing,

and it is because they are pressing and because they urgently require consideration, that unification is imperative. Unless the medical men at present in the service appreciate this point, this essential principle, it is well-nigh impossible for their brethren in the profession to help them.

We invite comments upon the subjoined scheme, drawn up by a Committee of the Council of the British Medical Association, and styled at the time "The West African Medical Service Committee," but reconstituted in August, as

# "THE CROWN COLONIES AND PROTEC-TORATE MEDICAL SERVICE COMMITTEE,"

In expressing an opinion upon the Colonial Medical Service the Committee feels that the Service is a general service in which men may be moved from one place to another, and that, therefore, the most complete unification obtainable is to be sought.

That although it may be expedient to organise as a temporary measure the conditions of service in particular districts, no satisfactory permanent result is obtainable by any piecemeal dealing with the subject.

### SUGGESTIONS.

- 1. That the service be called the Colonial Medical Service.
- 2. Candidates for appointments in the Colonial Medical Service should hold qualifications which are registrable in Great Britain, or such other medical qualifications as may hereafter be determined and approved.
- 3. It is desirable to hold an open competitive examination in London under the authority of the Colonial Office for admission to the Service.
- 4. Candidates should not be over 30 years of age, and be physically eligible to undertake duty in warm climates.
- 5. All successful candidates who have not previously taken up a course of tropical medicine, and produced evidence of proficiency, shall be required to do so before proceeding to take up their appoint-During the period of receiving instruction a small daily allowance should be made to cover expenses of training, this to include lodging and mess allowance.
- 6. Definite grades and uniform nomenclature should be established throughout the service.
  - (a) All candidates on appointment should be given suitable designation and titles to distinguish them as belonging to the Colonial Medical Service and to designate their trade.
  - (b) The following titles appear convenient:—

- 1. Assistant Colonial Surgeon, 1 to 5 years' service.
- 2. Colonial Surgeon, 5 to 8 years.
- 3. Senior Colonial Surgeon, 10 to 15 years.
- 4. Principal Colonial Surgeon, 15 to 25 years.
- 5. Deputy-Inspector-General, 25 years and upwards.
- Inspector-General, Colonial Medical Service.

This Colonial medical officer to be responsible for the administration of the Service throughout the Crown Colonies and Protectorates under the Colonial Secretary.

A Colonial Medical Board would be attached to his office for duty.

- (c) The service being thus unified, opportunities for change of station on promotion from grade to grade should be encouraged. A medical officer should be able, however, to proceed from grade to grade without changing station should he desire it.
- (d) Promotion for meritorious service should be entertained on the recommendation of the Governor in Council.

# I.—ORGANISATION.

The medical officers employed in each Crown Colony or Protectorate should be organised into a medical service, at the head of which should be the senior medical officer who should be an ex-officio member of the Council of the Colony or Protectorate.

### II .- PAY.

The pay should not be less than £350 at the commencement. Seeing that the conditions and expenses of living differ so materially in different colonies, additional allowances would have to be established by the local Councils for all medical officers serving in that colony.

For such extra duties as post mortems, inquests, travelling claims, &c., extra pay should be granted.

For every twelve months spent in the West Coast of Africa leave for six months should be granted to the medical officer as to other officers in the colonial service.

There should be no restrictions as to the invaliding of sick officers by a properly constituted Board.

# III.—GRATUITY.

7. After 10 years' service, a Colonial medical officer should have the option of leaving the service on a gratuity of £1,000, thereby waiving all pension claims, and after 15 years' service a gratuity of £1,500.

### IV .- Pension.

8. A medical officer should be entitled to retire after 20 years' service on a pension of £1 a day, and after

further service with increasing increments of 2s. 9d. per day for every  $2\frac{1}{2}$  years of service. Fifteen years' service on the West Coast of Africa to count as 20 elsewhere.

# V.—QUARTERS.

Properly constructed tropical quarters in accordance with the teachings of sanitary science should be provided, and, where this is not practicable, an adequate allowance should be made.

### VI.—MESSING.

That suitable mess quarters should be provided for the medical officers, and facilities given for organising the mess.

We hope medical men in the Crown Colonies and Protectorates will come forward with their opinions upon this scheme. For the moment it is not pay, &c., which is the point of primary importance, it is unification and organisation of the scattered units of the service into a real service on a footing with the other public services of the country.

# IDENTIFICATION OF MOSQUITOES SENT FROM TRINIDAD.

To the Editors of THE JOURNAL OF TROPICAL MEDICINE.

Dear Sirs,—I have forwarded to you specimens of two species of *Culex* mosquitoes, and I shall feel obliged if you will have same identified for me. They are the common house pests here during the rainy season, and I am desirous of investigating their connection, if any, with the prevalence of malarial fever, leprosy, &c. One of them, the brown, I have already found to be an efficient host for filaria nocturna.

Yours, &c.,

St. Ann's Port of Spain, GEO. A. VINCENT.
Trinidad, W.I.
October 10, 1901.

# REPORT ON THE ABOVE MOSQUITOES.

By F. V. Theobald, M.A.

DEAR SIRS,—The box of mosquitoes from Trinidad, collected by Mr. Vincent, contained, as the collector says, two species. One is Stegomyia fasciata, Fab., the other the common Culex fatigans, Wied. Both species are well-known household forms, and have a very wide distribution in tropical and sub-tropical climates, and to some extent spread into warmer temperate climes. The former, for instance, occurs in Italy, Ficalbi describing it from that country as Culex elegans.

The stegomyia is the supposed carrier of yellow fever—the *Culex* of *Filariasis*. Neither of the above two species at present are known to be in any way connected with malaria, all evidence goes against their having anything to do with it.

British Museum (Natural History).

# Article for Discussion.

# THE DANGERS OF SUBCUTANEOUS INJECTION OF QUININE.

By F. SMITH, D.P.H.Durham.

Major, R.A.M. Corps, Sierra Leone.

Having in view the reputed liability of this form of administering quinine to cause tetanus and abscess, I have only used it in a few extreme cases of coma, &c., and when the patient was too far gone to take the drug by the mouth. No ill result came about and probably some lives were saved. Therefore it is well that the subject is brought forward for discussion, inasmuch as it would seem that patients are sometimes lost through the hesitation of the doctor to inject before it is too late.

No great precautions were adopted in the method, because quinine itself was regarded as sufficiently antiseptic. In some cases treated on the march, the skin has merely been rubbed with aqueous solution of hydrochlorate of quinine, such as was afterwards injected. In other circumstances the syringe has been sterilised and the skin disinfected with carbolic lotion. Sometimes the puncture was covered with plaster. But I have seen two very bad abscesses with sloughing after injection of aqueous solution of quinine hydrochlorate. Both cases were under one physician. Septic infection was suspected; therefore in the second case precautions were taken. I saw the syringe sterilised, the solution of quinine heated and the skin cleaned, but did not, I am sorry to say, see the injection actually made. In this case, the patient being unconscious for two or three days, further injections were made and it did not occur to the operator to vary the site; all the injections were made in one arm. The man recovered, but had extensive abscesses, the original puncture not being exempt. patient was in hospital for months with huge areas of sloughing, exposure of fasciæ, &c .-- the areas affected by different injections having coalesced-and he, of course, bears big scars to this day. Therefore, I still avoid quinine injection as much as possible.

What is the cause of these abscesses?

Solution of quinine ought to be antiseptic enough of itself and it is questionable if the abscesses are the results of sepsis alone.

Negative chemiotaxis may explain tetanus. Can the same theory be applied to the abscesses in the case of some supposititious organism which may perchance be unaffected by quinine and flourish in the immediate area of injection where the drug will be strongest?

In appearance the two abscesses suggested direct destruction of the parts affected. A circumscribed area was apparent early, the skin and subcutaneous tissue corresponding to this area eventually sloughing out. There was no subsequent spreading, the exposed surfaces being kept clean, and there were no secondary infections.

It may be that the solution used was not weak enough, but it was similar to that used in all the cases.

Perhaps intravenous injection would be safer as regards abscess, but rectal injection is often sufficient.

# Brugs and Appliances.

ABBEY'S SALT.—The pains taken by chemists and others to provide pleasant remedies for the minor ailments of life is a section of pharmacy which is apt to be set aside and at times neglected. Illnesses are fortunately not all of a serious character; the majority of ailments are of a slighter nature, a mere departure from the normal, a temporary physiological upset. Especially of warm climates is this true. The liver is called upon in tropical and sub-tropical countries to serve the physiological functions of the body in a manner altogether in excess of what obtains in temperate climates. The first effect of heat is to excite the action of the liver, but after residing for say twelve months in a tropical climate the liver becomes exhausted, and the balance of function is now above, now below the normal. The consequence is digestive and other troubles, which are ever apt to engender the habit of taking drugs. The ailment is functional merely, and a mild corrective is all that is required. The Abbey Effervescent Salt Co., Ltd., of London, have prepared a salt which is a corrective of the nature indicated, and we have no hesitation in recommending it. It is pleasant to take, and can be used as a refreshing drink, or as a gentle laxative, according to the quantity taken.

HARTMANN'S WOOD WOOL PREPARATIONS.—We have been favoured with samples of Hartmann's Patent Wood Wool Wadding and Wood Wool Tissue, both im-

pregnated with corrosive sublimate. Our experience of these preparations in surgical practice enables us to speak with confidence of their usefulness and reliability. A comparative trial at one of our public hospitals of the virtues of several kinds of antiseptic dressings, shows that the preparations of the Sanitary Wood Wool Company have no superior. Hartmann's Wood Wool preparations in the tropics are well known, and the accouchement conveniences supplied by the Company have proved a boon to travellers and residents in warm countries. We can personally testify to the usefulness of these preparations in tropical practice.

# Correspondence.

MOSQUITOES AND LEPERS IN PUERTO PRIN-CIPE, CUBA.

To the Editor of The Journal of Tropical Medicine.

SIR,-As showing the conditions of life in a leper country, Puerto Principe Province, Cuba, let me quote from a recent letter from my brother, who is local engineer of Survey Party for the railroad now building from Santiago to

Havana (Sir William Van Horn's line).

"We are moving camp," he says, "about every ten days or two weeks, and are working through guinea grass from 8 to 10 ft. high, or through heavy woods with dense undergrowth, in which the mosquitoes are something terrific. Frequently when I am with the peons at the head of the line I make a slap and cover my hands and face with blood from those that have been feeding on me. So far we have all kept perfectly well, as I have Apollinaris, Scotch whisky, and plenty of quinine in camp; but a number of my peons have been sick with malaria, and there is much sickness through the country. We are now camped at El Zanjin, the place where the agreement was signed between the Cubans and Spaniards that ended the ten years' war; and here we have the worst water yet. When we wash we have to dip small fish, tadpoles and mosquito larvæ out of the basins. The rainy season is now on, October being said to be the wettest month.

"Most of the lepers of Puerto Principe province are not

isolated. Only thirty are in the hospital.

ALBERT S. ASHMEAD, M.D.

New York.

# Hews and Motes.

In relation to the recent correspondence in The Times and elsewhere, regarding enteric fever and water-filters, it is announced that the Sanitary Institute in connection with its recent Conference on Water Supply, has held an exhibition of the principal filters alleged to prevent infection, and has given its only highest award (the Silver Medal of the Institute) to the Pasteur (Chamberland) Filter.

MALARIA AS AN ANTIDOTE TO CANCER.—Professor Loeffler has suggested the inoculation of a cancerous patient with malaria as a means of cure of the malignant growth. He thinks he has discovered an antagonism between the two diseases, asserting that cancer is a rare disease in tropical countries where malaria is rife.—Medical Record, October 26th, 1901.

# Current Aiterature.

# YELLOW FEYER.

A MEDICAL BOARD TO EXAMINE CALDAS AND Bellinzaghi's Yellow Fever Serum.—An order has been issued at the war department, Washington, convening at Havana a board of medical officers headed by Major Havard, Chief Surgeon of the Department of Cuba, for the purpose of examining into the proposition of Dr. Caldas and Dr. Bellinzaghi, who will submit a cure for yellow fever and a serum designed to prevent the contraction of that disease. Dr. Caldas is a Brazilian, and his proposition recently was submitted to the war department by the Brazilian minister. A letter has been received at the surgeongeneral's office from Major Havard saying that two suspected cases of yellow fever had been discovered in Havana. In connection with these experiments the yellow fever commission will supply the mos-The commission has eight insects which have bitten a person suffering with a bad case of yellow fever. Two of the mosquitoes subsequently bit two persons, who have since developed well-marked attacks of the disease. The eight mosquitoes will be divided into two divisions. Two persons whom Dr. Caldas will inoculate with his serum will be bitten by two mosquitoes each. The other four mosquitoes will bite two non-immunes, two each. As all eight mosquitoes were infected from the same person, and as two of them have already given yellow fever to two persons, it is inferred that the arrangement will afford a good test of the preventive value of the serum, although other experiments will probably be conducted.

Since the foregoing was written Major Havard has announced that the mosquito tests as to propagation of yellow fever will be discontinued. This decision was reached because one of the non-immunes who was recently bitten by an infected mosquito has died of yellow fever. The man, who was a Spaniard, desired to become an immune and therefore allowed himself to be bitten by the mosquito. Another man

who was bitten is also dead.

According to Major Havard, the cases due to mosquito infection prior to the latest two were light. But, as the insect infection has assumed a more dangerous form than the first experiments led the Yellow Fever Commission to expect, it is now thought best not to allow Dr. Caldas's and other proposed experiments in this line.—New York Medical Journal, August 24, 1901.

INEFFICIENCY OF THE CALDAS SERUM.-Dr. Caldas is returning to Brazil, since his experiments with the alleged yellow fever remedy have resulted in failure. He and Dr. Bellinzaghi went to America some time ago and endeavoured to enlist the co-operation of the Medical Department at Washington, but without They then went to Havana, and Governor-General Wood was induced to appoint a commission to investigate the claims of the Brazilians. board consisted of Drs. Gorgas, Finlay, Guiteras and Agramonte. It has finally decided that under no condition should further experiments of the kind be

The Hospital.

Treatment.

in advance.

made. A full report will soon be made and filed with the Governor-General.

Yellow Fever in Cuba. — Assistant Adjutant-General Colonel Hickey, of the Staff of General Wood, says that not a single death from yellow fever has taken place in Cuba this year. The plague has been successfully overcome by the efficient sanitary measures employed by the United States health officials, the city of Havana itself having been revolutionised in this respect, and the other towns on the island cleaned and renovated. The use of kerosene oil and petroleum for sprinkling the streets and covering the ponds and cesspools has been very efficient in almost entirely exterminating the insects. The amount of oil used is one ounce to every square foot of surface.—Pacific Med. Jour., October, 1901.

Dr. Sternberg on Yellow Fever.—In his annual report to the Secretary of War, Surgeon-General Sternberg, himself an acknowledged authority on yellow fever, adds the weight of his official approval to the mosquito theory. He says: "The results obtained were especially valuable, showing that the bacillus icteroides (Sanarelli) bears no causative relation to yellow fever, and that the mosquito serves as an intermediate host for the parasite of this disease. Further experiments of a most interesting character demonstrated that yellow fever is transmitted to nonimmunes by the bite of a mosquito that has previously fed on the blood of those sick with this disease; that yellow fever can also be produced by the subcutaneous injection of blood taken from the general circulation during the first and second days of the disease; that an attack of yellow fever produced by the bite of the mosquito confers immunity against the subsequent injection of infected blood; that yellow fever is not conveyed by clothing, bedding, or merchandise soiled by contact with those sick with the disease; that a house may be said to be infected with yellow fever only when there are present in it mosquitoes capable of conveying the parasite of the disease, and that the spread of yellow fever can be most effectually controlled by measures directed to the destruction of mosquitoes and the protection of the sick against the bites of these insects." He adds that the results of these investigations are of far-reaching consequences.

# EXCHANGES.

Archiv für Schiffs u. Tropen Hygiene.
Archives de Medicine Navale.
Archives Russes de Pathologie, de Médec., Clinique et de Bacteriologie.
Australasian Medical Gazette.
Boletin de Medicina Naval.
Boston Medical and Surgical Journal.
Bristol Medico-Chirurgical Journal.
British and Colonial Druggist.
British Journal of Dermatology.
British Medical Journal.
Brooklyn Medical Journal.
Caducée.
Climate.
Clinical Journal.

Annali di Medicina Navale.

Clinical Review. Giornale Medico del R. Esercito. Hong Kong Telegraph. Il Policlinico. Indian Engineering. Indian Medical Gazette. Indian Medical Record. Janus. Journal of Balneology and Climatology. Journal of Laryngology and Otology. Journal of the American Medical Association. La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal. Medical Brief. Medical Missionary Journal. Medical Record. Medical Review. Merck's Archives. New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyclinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo. Sei-i-Kwai Medical Journal.

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- 1.—All communications will be acknowledged in the JOURNAL under the heading "Letters and Communications Received." Contributors who do not see their names in the list should communicate forthwith with the Editors or Secretary.
  - 2.—Manuscripts sent in cannot be returned.
- 3.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
- 4.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.
- 5.—Authors desiring reprints of their communications to the Journal of Tropical Medicine should communicate with the Editors
- 6.—Correspondents should look for replies under the heading 'Answers to Correspondents."

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In order to meet the constant enquiry for addresses of respectable firms catering for the various requirements so difficult to obtain abroad, we give a list of names and addresses which we trust will be found useful to our numerous correspondents and subscribers.

# Original Communications.

THE NEW BIOLOGICAL TEST FOR BLOOD— ITS VALUE IN LEGAL MEDICINE AND IN RELATION TO ZOOLOGICAL CLASSI-FICATION<sup>1</sup>.

By George H. F. Nuttall, M.A., M.D., Ph.D.

University Lecturer in Bacteriology and Preventive Medicine, Cambridge.

The demonstration by me in 1886 to 1888, of the existence of bactericidal properties in the blood and other fluids of the body (properties the existence of which were indicated by the independent observations of von Fodor), has in the course of the last thirteen years led to the discovery of other properties, both natural and artificially produced in the blood of man and animals. We now know of the existence of specific bactericidal substances, anti-toxins, agglutinins, hæmolysins, of the formation anti-bodies in the blood which are capable of neutralising the action of rennet, and of destroying certain cellular elements (spermatozoa, epithelial cells). We have learnt more recently of the existence of precipitins in the blood of various animals treated with filtrates of bacterial cultures, the serum of certain animals, milk, pepton, &c.

The chemical nature of these various anti-bodies is but imperfectly understood. The substances which bring about the phenomena of agglutination of bacteria, have been proved to be distinct from the so-called precipitins. The agglutinins are more readily destroyed by heat than are the precipitins. Whereas injection of tetanus cultures into animals leads to the formation of specific agglutinins, no specific precipitins are formed. Several of the anti-bodies named may be found within the body at the same time, for example, precipitins, agglutinins and hæmolysins may be formed,

The names applied to the various anti-bodies named are in accordance with their action in vitro or in the body. The anti-toxins neutralise the particular toxin with which an animal has been treated, the neutralisation depending upon anti-toxin and toxin entering into chemical combination. In the case of the agglutinins, hæmolysins, and cellulicidins, a reaction takes place which is visible to the eye through the fact that cellular elements (bacteria, blood-corpuscles) are clumped, that blood-cells are dissolved, or that cells are visibly altered and destroyed. The precipitins bring about a visible reaction, that is a precipitation in two previously clear fluids, when an anti-serum is mixed with its homologous serum, or when an antiserum is mixed with its homologous culture-filtrate, provided in the latter case that the blood or culture injected is capable of bringing about the formation of precipitins in the body of the treated animal.

The existence of specific precipitins for certain bacterial products was first demonstrated by Kraus (1897), who found that when he added anti-typhoid, anti-cholera, or anti-plague serum to clear culturefiltrates of the corresponding bacteria, that a precipitation occurred. Nicolle (1898) confirmed these observations with regard to cholera and typhoid, and found that specific precipitins were also produced in animals by injections with cultures of Vibrio massauah. Subsequently Marmorek found that precipitins were produced by injections with the Streptococcus, and lately Kraus (1901) has found the same to occur when animals were treated with cultures of the glanders bacillus. In all of these experiments, only the homologous anti-sera acted upon culture-filtrates of each particular germ. Kraus found that the reaction was not impeded through the addition of antiseptics to the fluids.

Following upon this fundamental discovery by Kraus, we find that Bordet (1899) observed the formation of precipitins in the blood of animals

as Bordet has shown in the serum of rabbit, which has been injected with fowl's blood.

<sup>&</sup>lt;sup>1</sup> Abstract of a Lecture delivered at The London School of Tropical Medicine, November 28th, 1901.

treated with milk. He injected rabbits with milk and found after they had been treated for some time, that their serum contained a precipitin which only produced a precipitation in the milk with which the animal had been treated. Fisch, in the United States, obtained similar precipitins when he injected udder cells into animals. Wassermann and Schütze, who repeated and extended the experiments of Bordet, were able to confirm these. They injected human milk and that of the cow and goat into rabbits, and found that an antiserum was formed in each case which only produced a precipitation in the particular milk with which the rabbit had been treated. Such anti-sera have been aptly termed "lactosera." By means of the lactosera we are able to distinguish various kinds of milk. The reaction, moreover, proves that different milks are different in chemical composition.

Similarly anti-sera have been produced which act on solutions of pepton. Whereas Tchistovitch upon solutions of pepton. obtained negative results in his experiments, Myers (1900) found that he was able to produce an antiserum for Witte's pepton by injecting pepton solu-tions into rabbits. The results of Myers lend support to Ehrlich's view that anti-toxin formation depends upon processes essentially similar to normal physiological processes in the body. If we inject toxins of bacterial origin (tetanus, diphtheria, &c.), or such as have been obtained from certain plants (abrin, ricin, rubin); or again, those derived from animals (snakevenom, scorpion-venom, eel-serum), we in each case obtain anti-toxins which are capable of neutralising their homologous toxins in vitro or in the body. If we inject pepton we observe that a neutralising body to pepton is formed—an anti-pepton. We know from the investigations of Wassermann that tetanus toxin enters into chemical combination with the nervous tissues of susceptible animals, and we know from the work of Neumeister that pieces of intestine are capable of entering into chemical combination with pepton. It seems clear, therefore, that the way in which toxin is taken up and pepton assimilated is essentially similar, and consequently we may assume that the formation of the anti-sera is brought about in a

The discovery by Tchistovitch (1899) of precipitins which act upon a serum with which an animal has been treated, was one of far-reaching practical importance. In treating rabbits with eel-serum, which is toxic, he observed that the treated animals' serum acquired specific anti-toxic properties, but that in addition it was capable of producing a precipitation in clear solutions of eel-serum. He observed the same phenomenon when he treated rabbits with horseserum, and then added their serum to dilutions of horse-serum. Bordet observed similar phenomena when he injected the serum of the fowl into rabbits. The results of Tchistovitch and Bordet have stimulated a number of investigators to take up the subject. Uhlenhuth confirmed the work of the French observers. Leclainche and Vallée (1901) and others were able to produce a specific anti-serum by injecting animals with albuminous urine. Uhlenhuth produced anti-sera, which acted on the bloods of the horse, ox and man, and found that dilutions of dried bloods also gave the reaction on the addition of their

similar manner.

homologous anti-sera. Uhlenhuth examined some twenty bloods and found that none of them reacted to the anti-serum for human blood, with the exception of human blood. Wassermann and Schütze, however, tested the blood of a baboon and found that it gave a similar reaction to that of man, and Stern obtained the same result with the blood from three species of monkey. The latter authors, therefore, conclude that the reaction is not strictly specific in character. My investigations were made prior to the publication of some of the foregoing results and have been confirmatory. I have been able to produce a variety of anti-sera, and am at present engaged in producing a large series of anti-sera, with the object chiefly of studying the zoological, or what I have termed, the "blood relationship" amongst animals.

Whereas previous workers had injected fresh sera into animals for the production of anti-sera, I found that I was able to produce an anti-serum by injecting old preserved fluids, thus, I obtained horse anti-serum by injecting some old anti-diphtherial horse serum (preserved two years and seven months in the laboratory by means of trikresol). Similarly human antiserum was produced by injections of human pleuritic exudate which had been preserved for seven months with chloroform. The anti-sera in these cases did not, however, produce as powerful a reaction as did fresh sera. I was able to confirm the observation of Uhlenhuth that solutions of various dried bloods were capable of giving the reaction, a fact which Uhlenhuth pointed out to be a matter of considerable medico-legal importance. I furthermore made the interesting observation that a mixture of five or six bloods does not prevent the reaction taking place when the antiserum for one of the bloods in the mixture is added. The reaction for human blood, for instance, is obtained in a mixture of five or six different bloods on the addition of human anti-serum, or on the addition of any other anti-serum for a blood in the mixture, even when the bloods in the mixture are diluted 1 in 500, or upwards. My observations have since been con-

firmed by Uhlenhuth and by Ziemke. Uhlenhuth has found that specific anti-bodies appear in the serum of a rabbit which has been fed on white of fowl's egg, and Moro has shown that when a gravid rabbit is treated with milk, the serum of the offspring may also acquire the properties of a lacto-Uhlenhuth has, moreover, shown that antisera may be used in the differentiation of meats. The anti-sera producing a precipitation in meat extract made by means of chloroform water. Even old smoked meats gave the reaction, and just as I found that I could detect certain bloods in a mixture, Uhlenhuth found that he could detect a mixture in hashed meat. Schütze has just shown that an antiserum may be obtained through injecting animals with muscle albumen. Kowarski, as also Schütze, find that precipitins are formed when vegetable albumens are injected, but we do not as yet know clearly whether or no the anti-sera in the latter case will possess a corresponding value in diagnosing the the different kinds of vegetable albumen.

In recent publications which have appeared in the British Medical Journal, in the Journal of Hygiene, and in a paper communicated to the Royal Society, I

have described the technical methods whereby the so-called specific anti-sera may be produced, and in the paper in the *Journal of Hygiene*, the reader will find the literature on the subject exhaustively treated.

find the literature on the subject exhaustively treated.¹

The anti-sera are produced briefly as follows: Assuming that we wish to obtain an anti-serum for human blood, we inject human blood intraperitoneally into rabbits. After about five injections, given at intervals of three or more days, the rabbit is bled to death, and its blood-serum collected. The serum of this rabbit will be found to have acquired the remarkable property of producing a precipitation immediately on its being added in small quantity to a dilution of human blood-serum. If allowed to rest, the precipitated substance gravitates to the bottom of the tube. I have now tested upwards of 280 bloods obtained from animals of all classes of vertebrates with such anti-serum for human blood, and have, with the single exception of monkey bloods, obtained negative results throughout. Similarly, if rabbits are treated with the blood of the horse, dog, ox, sheep, monkey, fowl, duck, &c., anti-sera are formed which produce precipitations only in the bloods of the animals whose blood was used for treatment, or, to a lesser extent, in the bloods of nearly allied animals.

In obtaining the anti-sera I have proceeded as follows: After the animal has received five or six injections, some days, usually a week, is allowed to elapse. If a rabbit has been treated, the ear is now shaved and sterilised, and a sample of blood is collected by means of a sterilised bulbed pipette, the blood being obtained from the punctured ear-vein. The blood is transferred from the bulb to a test-tube where it is allowed to clot. The separated serum is then drawn off into fine sterilised pipettes, the ends of which are sealed in the flame.

The bloods to be tested are diluted to a suitable degree, 1 in 50, 1 in 100, or 1 in 200, or more, with normal salt solution, and the dilution is transferred to small test-tubes. Other investigators have repeatedly spoken of the difficulty they have had in obtaining clear blood solutions, having for that purpose to resort to filtration of the solutions through Pasteur-Chamberland filters, &c. I have found a very much simpler method to give excellent results. If I wish to obtain a clear solution of a blood, I simply soak up the blood with pure filter-paper and allow the paper to dry, this, if necessary being greatly hastened by placing the filter-paper in a thermostat at about 37° C. When the dried filter-paper, or a piece of it of suitable size, is dropped into normal salt solution, it almost immediately gives a clear blood solution, particulate matter being retained within the meshes of the paper. If it were not for this simple method I should scarcely be in a position to pursue the extended study of bloods which I have undertaken. I am now obtaining bloods from all parts of the world, the samples having been dried on strips of filter-paper, which are forwarded readily through the post. The collector in each case notes the name of the animal, date, &c., with leadpencil on one end of the filter-paper which has been

Whereas Wassermann noted that he was able to keep his anti-sera for blood testing for two weeks in the refrigerator, I have found that I could keep them for months in sealed tubes, or through the addition of a small quantity of chloroform. The chloroform unquestionably causes a more rapid deterioration in the precipitating power of an anti-serum, but in some cases its use may be very convenient, especially when there has been a chance of the anti-serum having become contaminated. Others (Uhlenhuth and Ziemke) have confirmed my observations with regard to the use of chloroform as a preservative, but they do not state a fact which I have observed, namely that it is necessary, before using it, to drive off the chloroform by placing the test-serum in the thermostat. A small quantity of chloroform in a test-serum will frequently cause it to produce a considerable clouding, which might be a source of error, as the clouding is produced in almost any serum to which the test-serum is added. Some of my test-sera still give a marked reaction after having been preserved for eight months in sealed tubes. From this fact, and the observation that old preserved exudates may bring about the formation of anti-sera when injected into animals, we may conclude that the bodies which bring about the formation of anti-serum, as also the bodies in anti-serum which produce the reaction in vitro, are remarkably stable bodies.

In making the test, I use mimimal quantities instead of the larger quantities employed by other observers. The reaction obtained with small quantities of antiserum are just as convincing as when larger quantities are employed. I place the serum dilutions to be tested in small test-tubes of a calibre somewhat smaller than a lead-pencil and about 4 cm. in length. About 0.5 cc. of the dilution is placed in the tube. A single drop of test-serum is now allowed to fall into the tube containing the dilution, to the bottom of which it sinks. The precipitation should take place almost immediately at the line of contact between the heavier serum and the supernatant blood dilution. I usually consider the reaction negative when no clouding occurs within fifteen minutes. It may occur that a clouding takes place when the tubes are allowed to stand longer, the cloud being produced at times in non-homologous blood dilutions, it is therefore necessary to observe a time limit in making the

Tchistovitch found that long-continued treatment of a rabbit with eel-serum lead to the animal becoming immune to its toxic effects. He also observed that the precipitins disappeared during prolonged treatment. I have observed the same to take place in rabbits treated for longer periods with human serum. There is therefore a point in the treatment of animals, where, for purposes of obtaining an antiserum, a maximum of power is reached, and the animal should be bled. This can be determined by periodic bleedings from the ear-vein, and tests

kept clean for the purpose. When paper of fairly constant thickness is used, it is possible to obtain blood-dilutions of fairly uniform strength by cutting out squares of blood-stained paper of a given size and adding a measured quantity of salt solution to them in a test-tube.

<sup>&</sup>lt;sup>1</sup> Brit. Med. Journ., vol. i. (May 11th, 1901), p. 1141; vol. ii. (Sept. 14th), p. 669; Journ. of Hygiene, vol. i. (July 1st), p. 367-387; Trans. Royal Soc., Meeting of Nov. 21st.

repeated in the manner described above. an animal yields a sufficiently powerful anti-serum, I bleed it to death by cutting its throat and catching the blood in a sterile vessel, the animal's throat having of course been previously shaved and sterilised.

The precipitum, as I shall in accordance with the suggestion of Myers term the body which is precipitated by adding an anti-serum to a blood dilution, certainly requires further study. Mr. Hopkins and I are at present engaged in studying its chemical properties, and our results will be made known in due course. The precipitum, as Tchistovitch showed, is soluble in dilute acids and alkalies, insoluble in water and solutions of alkaline carbonates and neutral salts. A precipitum is only formed in alkaline solutions. Heating the serum to 56° to 60° C. has little or no effect upon its power to produce the reaction. Nolf has shown that precipitins may be produced as the result of injecting purified serum globulin; injections of washed blood-corpuscles produced no

In choosing an animal for the production of an anti-serum, we must not forget that in some cases the result may be negative. For instance, Bordet found that when guinea-pigs are treated with rabbitserum no anti-body is formed, and Nolf made a similar observation on pigeons treated with chicken blood. Naturally the choice of animals will largely depend upon the convenience of keeping the animals in the laboratory. The rabbit has for this reason

been the animal most frequently chosen.

I have tested the bloods of twenty-two species of monkey, which include members of the four known families of apes, and finds that they all react to the human anti-serum, but none of the other 280 bloods gave a similar reaction, amongst these bloods being those of two species of Lemur. The blood of the New World apes (Hapalidæ and Cebidæ) gave less reaction than that of the Cercopithecidæ and Simiidæ. The blood of Hapalidæ gave no reaction with weak human anti-serum. On the other hand the blood of Simiidæ (ourang-outang, chimpanzee) appeared to give about as much reaction as human blood. My tests having been made with dilutions of dried bloods did not, however, permit of exact conclusions with regard to this similarity between the blood of Similar and man. Dr. Grünbaum, of Liverpool, however, informs me that the amount of reaction obtained by him with these bloods was practically indistinguishable from that obtained with human blood, either in quality or quantity. He has prepared gorilla, ourang, and chimpanzee anti-sera, and finds that they not only react with their own blood, but also with each other, and also upon human blood.

If, for the time being, we exclude the Simiidae, we may expect that anti-sera for the other monkey bloods would enable us to differentiate their blood from that of man, for the reason that human anti-serum would give a more marked reaction with human blood than it does with monkeys' blood and vice versâ. If we may accept the degree of blood reaction as an index of the degree of blood relationship between the Anthropoidia, then we find that the Old World apes are more closely related to man than are the New

World apes, and this is exactly in accordance with the opinion expressed by Darwin.

It is safe to say that the new blood test is capable of medico-legal application for the detection of blood stains. We have a good deal of experimental observations on this head from different workers. I might casually mention that I have obtained a perfectly characteristic reaction with human blood which has been putrid for two months. Uhlenhuth and others have made many similar tests, and have obtained positive results in some cases with blood stains several years old. In some cases these blood stains are difficult to extract, and in such cases Uhlenhuth finds it better to extract with 0.1 per cent. soda solution instead of normal saline.

With dog anti-serum only six out of the 280 bloods gave a positive reaction, these bloods being those of other species of Canida (foxes, jackals, wolf). Horse anti-serum only produced a reaction in donkey blood dilutions, no other equine bloods being tested. Antisera for ox and sheep blood gave positive though less marked reactions with the bloods of other true ruminants. It is interesting to note that the bloods of Tragulidæ and Camelidæ gave no such indications of blood relationship with the true ruminants. The anti-serum for fowl's egg albumen produces but a slight reaction with dilutions of fowl's blood, when a great amount of precipitum is produced in solution

of fowl egg albumen.

To conclude, we have a very delicate test in the anti-serum for bloods, a test which will have its use in legal medicine, and which will permit of our studying the relationships between animals. It is a very remarkable fact that a common chemical property has persisted in the bloods of the Anthropoidia throughout the ages which have elapsed during their evolution from a common ancestor, and this in spite of differences of food and habits of life. Similarly the blood-relationships existing between other groups of animals serve to carry us back into geological times. I believe that by means of these studies on the blood we shall have most valuable aid in the study of various problems of evolution.

I shall be exceedingly indebted to any reader of this paper who will aid me in this investigation, through collecting specimens of blood when occasion arises, and I shall be happy to forward a bloodcollecting outfit to those who will favour me with their addresses. The "outfit" is simplicity itself, for it only consists of slips of filter-paper contained in paraffined covers, together with brief directions on

how to take the samples.

P.S.—In recent papers by Uhlenhuth, that author takes to himself the credit of having discovered the test for blood above described. Uhlenhuth, as a matter of fact, has discovered no new principle. He only followed the lines laid down by Tchistovitch, Bordet, and Myers. It is true that he was the first to obtain an anti-serum for human blood, and that he proved that the reaction took place with solutions of dried blood, &c., but he is totally unjustified in taking the credit of the method to himself, especially as he is evidently perfectly au courant with the literature of the subject.

# OTE ON RECOVERY FROM TEMPERATURE OF 110° F.

By JAMES CANTLIE, M.B., F.R.C.S.

In an article on "Siriasis" in the Lancet of June 12, 1901, Mr. A. E. Griffin remarks that "it is interesting to note the recovery, after a temperature of 108.6° F. Gihon states that there had been only two cases of recovery when the temperature had reached 109°, and seven when 108° and over had been registered, out of the several hundreds of cases recorded in America."

In reference to this matter it is worthy to place on record a case of high temperature which occurred in a patient of Dr. Wm. Hartigan's, in Hong Kong. A man, over 50 years of age, engaged in superintending harbour works, developed a high temperature about 10 o'clock in the morning. The temperature quickly rose, and when Dr. Hartigan saw his patient the thermometer registered 110° F. Dr. Hartigan was dubious as to the correctness of the thermometer, but on testing it subsequently it was found to be perfectly reliable. When the writer saw the case some forty minutes afterwards with Dr. Hartigan the temperature was then 108.2° F., although the patient was, and had been, perspiring freely, and although his body was wrapped in wet sheets and was being rubbed with ice. The patient seemed by his appearance to be beyond recovery when the temperature was at its highest, but yielding to the treatment energetically pursued by Dr. Hartigan, the temperature rapidly fell, and in two hours after attaining its maximum the temperature dropped to 102° F. The patient recovered completely, and in a week or so was about again.

In my own practice the highest temperature recovered from was one of 107.6° F. The fever seemed to defy all the usual methods of treatment, and it was only when 6 grains of antipyrin were administered hypodermically that the temperature began to fall. It fell rapidly, and the patient was soon about again. occurred in the year 1888, in Hong Kong, and as far as I know was one of the first cases of hyperpyrexia treated by injecting antipyrin hypodermically. Of temperatures in "heat stroke," combined with alcoholism, I have seen five over 110°, namely, 110·4°, 111·0°, 113.4, 112.0° and 111.5°. All these cases died in a few hours. I tried bleeding from the arm in two cases Were I confronted with such cases, but too late. again I should bleed early, and if the flow of blood from the arm veins was unsatisfactory, I should aspirate the liver and draw off ten to twelve or more ounces of blood from that organ.

TURPENTINE IN PARASITIC SKIN DISEASES.—Dr. L. Leven employs applications of oil of turpentine in the treatment of pityriasis versicolor and tinea tonsurans. In the first affection a cotton pledget is soaked in turpentine and vigorously rubbed on the diseased skin. This is done once daily. If the lesions are extensive, only small areas should be thus treated at each sitting. For the second disease the author recommends the use of compresses soaked in turpentine and applied to the affected areas morning and evening. The good results show themselves in a very short time. - La Sem. Méd., vol. xxi., No. 8.

# British Medical Association.

(Continued from p. 399.)

SOME POINTS CONNECTED WITH HUMAN FILARIASIS.

By J. EVERETT DUTTON, M.B.Vict. Walter Myers Fellow, Liverpool School of Tropical

THE remarkable fact that the embryos of filaria Bancrofti, after reaching a certain stage in their metamorphosis in the body of the mosquito, tend to travel and collect in the proboscis of that insect, has attracted a good deal of attention among the students of tropical parasitology, and has opened up a new era in the etiology of filariasis.

It is interesting and worthy of note that this observation has been recorded by workers in many parts of the globe. Low demonstrated the young filariæ in the proboscis in sections of Culex ciliaris obtained

from Australia.

James,2 in India, showed that in Anopheles Rossii the embryos of filaria Bancrofti were capable of development, and in the latter stage of metamorphosis even-

tually reached the labium of the proboscis.

The members of the Liverpool Expedition to Nigeria<sup>3</sup> in West Africa have recorded similar observations working with Anopheles costalis; and lastly, Grassi and Noe<sup>4</sup> have traced the development of the embryo of filaria immitis of dogs in Anopheles maculipennis to its final stage, which is found in the labium of the proboscis of that insect; from this position they have shown that the young filaria passes into its definitive host when the insect bites.

It is to the question of transmission of the filaria Bancrofti to man by means of inoculation during the act of puncture of the skin by an infected mosquito, that I wish to draw attention. Many observers have repeated Manson's now classical work on the development of the embryo filaria Bancrofti in certain species of gnats, and it has been ascertained that many species of Anopheles and Culex are capable of acting as intermediary hosts for this parasite. Manson's original hypothesis that the young filaria after metamorphosis in the body of the mosquito, were, on the death of that insect transmitted to water or other medium, and from thence to man, was held as probably correct until Low, last year, found young filariæ in sections of the proboscis of infected mosquitoes, and put forward the possibility of man becoming infected by the bites of these insects; previously Bancroft,5 in 1900, suggested that the young filaria nocturna, by making an independent passage for itself into the æsophagus of the mosquito, might pass down the proboscis into the human skin.

During the stay of the members of the Liverpool Malaria Expedition in Nigeria experiments were undertaken to study the life-history of filaria Bancrofti in its intermediary host. On dissection of specimens of Anopheles costalis which had been caught in native huts many were found to be infected with filaria (6 per cent.), nearly all the stages described by Manson were observed, and it was noted in a few specimens after teasing the thoracic and abdominal tissues no filariæ

were seen; yet on dissection of the head, large, fullydeveloped forms, very active in normal saline were discovered. Thinking that these young filariæ were probably filaria Bancrofti, and that this mosquito might therefore act as a host to the parasite, specimens of this species hatched from the pupæ were fed on cases of filaria nocturna every other day at 11.30 p.m., three to six times in all. The experiments at Old Calabar failed, but at Bonny more success was attained and the stages in the development of the young embryo were observed. On August 4th, four mosquitoes remained out of a batch fed on a case of filaria nocturna for the first time fifteen days previously; one of these mosquitoes was found dead in the cage, this was dissected and in the labium a long filaria which appeared to be partly macerated was found. A mosquito was then taken from the cage and killed with chloroform, placing a needle through the thorax, the labium and maxillary palps were pulled away from the base of the head and stylets by gentle traction with the finger-nail placed on the tip of the proboscis. In this way the exoskeleton of the labium was separated, leaving its two trachea and nerves attached to the head; on placing the dissection under the microscope, from the loose connective tissue left behind a long actively moving filaria was seen to escape. The worm lived one hour in normal saline. It measured 1.006 mm., and 0.023 mm. broad. It tapered slightly to each end. At the anterior end, which was rounded off, the cuticle was At the antethickened to form a few very small papillæ displaced round the oral orifice, which was terminal.

The posterior end, which was also rounded off, was provided with four papillæ which arose almost at right angles to the axis of the body of the worm; the anus appeared terminal. The alimentary canal could be seen to run straight down the worm and showed no differentiation into æsophagus and intestine. Besides the alimentary tube two other tubes could be seen, which were, for the most part, straight, but at one or two points were seen to twist round the intestine. Towards the head end, at a distance of 0.14 mm. from the anterior end, there was an indication of the presence of a genital orifice, towards which

the reproductive tube was seen to bend.

It is remarkable how far advanced in development the embryo had become. In fact, as shown above, nearly all the organs seen in the adult filaria Bancrofti could be traced, even sex could be distinguished; the worm thus resembled the adult form found in the lymphatics, only on a small scale, though retaining its four-lobed tail, no doubt a valuable aid in progression along the labium. In this connection it is interesting to note that among some new species of bird filariæ having hæmatozoal embryos described by the members of the expedition to Nigeria,6 many immature adults were found in the tissues, and were very similar in structure to the young filaria nocturna as seen in the mosquito's proboscis. That the structure of the young filaria at this stage of its metamorphosis should so closely resemble the adult would tend to negative the idea of an independent existence in water or other medium.

It is extremely probable that the filariæ on reaching the proboscis lie extended in the loose connective tissue of the labium, and are not free amongst the stylets as Low<sup>7</sup> thought he had seen, although his illustrations represent them as lying in the labium. James<sup>8</sup> states he found a filaria on two occasions stretched out lengthwise within the tissues of the labium of the proboscis; from his drawing he clearly indicates the filaria in the labium.

Grassi and Noe<sup>9</sup> state definitely that the larvæ of filaria arrived at maximum development, progress towards the head, and collect there rapidly in the prolongation of the general body cavity within the

labium.

It has been shown that the members of the expedition to Nigeria also found the filaria in this position after fifteen days from the first feeding on a case of filaria nocturna; the question now arises, how do the filaria escape from the strong chitinous case of the labium?

Grassi and Noe<sup>10</sup> believe that, owing to the bending of the labium stuffed with filaria, when the mosquito pierces the skin with the stylets, the rupture of the integuments at the bend made in that organ near its centre is brought about, which allows the escape of the filaria along its dorsal groove; in some specimens they believe they have seen the rupture after the escape of the filariæ.

That such a rupture in the chitinous exoskeleton could take place appears somewhat extraordinary; and, furthermore, if one considers the position of the filariæ inside the labium, it would appear a difficult matter for the filariæ to escape, even if such a rupture as described by the Italian observers took place.

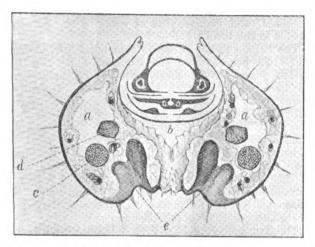
Now, the young filariæ in the stage found in the proboscis measure nearly half the length of the labium in Anopheles costalis. Supposing for the moment that the worm was situated in the distal half, then, to escape through the rupture occurring about the middle of the labium, it must either turn round—a supposition in itself very unlikely owing to the small internal width of the labium (about  $52\mu$  by  $29\mu$ )—in the distal half, which practically only admits of of the presence of two filariæ; or it must emerge tail first, and would then have to travel some considerable distance to reach the skin.

Neglecting, then, for the moment the preceding hypothesis with regard to the escape of the filaria from the labium, the question arises, is there any loophole in the anatomical structure of the labium

whereby their exit would be facilitated?

The labium, the largest of the mouth parts of the proboscis, is a rounded cylinder of chitin, lined with delicate connective tissue, and containing a pair of nerves, two large trachea, and a pair of muscles arising from its lateral surfaces. Externally it is covered with hairs and scales, except on its superior surface, which is of smooth, thick chitin, depressed inwards to form an oval channel in which the stylets rest. To the extremity of the labium are attached by true joints (pointed out by Dimmock<sup>11</sup>), two conical organs, the labellæ, convex on their outer surfaces, and hollowed out on their inner approximated surface; on these latter, from definite areas above and below project specialised hairs; centrally these surfaces are ridged and furrowed, and enclose the tips of the stylets and the tip of the labium proper.

This latter structure is very delicate, and is formed by the continuation of the upper chitinous surface of the labium, which gradually narrows to a blunt point covered with minute hairs. In a transverse section of the labium at its junction with the labellæ (see fig.) three areas can be made out; two lateral pear or kidney-shaped areas, the inferior broad rounded extremities of which are approximated towards the medium line; these areas articulate with the base of the labellæ. Between the pear-shaped areas is a roughly triangular region, bounded above by the stout band of chitin forming the upper surface of the labium, and on which the stylets rest, and on either side by the two lateral regions of the labium. This area is occupied by a very delicate loose membrane covered with very fine hairs; it is easily torn, and is rather difficult to see under the microscope owing to its transparency.



TRANSVERSE SECTION OF PROBOSCIS OF Anorheles costalis at LABELLAR JOINTS.—(a) Lateral pear-shaped end of main body of labium; (b) triangular region. Above (b) chitinous surface of tip of labium; below. loose membrane; (c) nerve to the labella; (d) tendon to labella; (e) regions of labellar joints.

Above it is prolonged under the tip or tongue of the labium and blends with the lateral free edges and apex, whilst laterally it is in intimate connection with the labellar joints. This region appears to be the weak spot in the chitinous exoskeleton of the labium. It seems probable that this membrane would allow of play, and would be stretched when the labellæ are applied to the surface of the skin in the act of biting by the mosquito, and, further, it is not difficult to imagine the young filaria or filariæ abutting against it would further stretch and so cause its rupture, if indeed they were not able to rupture so delicate a structure by their own exertions. It is to be noted that this region is in very close relation to the skin when the mosquito draws blood, so that the young filaria would, if set free by the rupture of the membrane, be practically over the point of puncture of the epidermis; at the same time it would be protected from injury by the tongue of the labium when the stylets are about to enter the skin. The bending at the base of the proboscis, which gradually travel forward to the middle of the organ as the stylets sink

deeper into the skin, would, in my opinion, tend to urge forward the filaria.

Manson<sup>12</sup> has suggested that the young filariæ can apparently discriminate between flesh and vegetable; he states "some mosquitoes fed on bananas had not been deceived into passing into so inhospitable medium, for up to forty days after the insect was infected, and after many meals of banana, they could be found coiled up in the head and stretching along the proboscis.'

Grassi and Noe,18 in a footnote to their paper on the "Propagation of the Filaria of the Blood exclusively by means of the Puncture of Peculiar Mosquitoes," state that "a great quantity of Anopheles," certainly infected within the labium on August 5th, submitted to a fruit diet presented the labium on August 13th completely empty."

It would appear from these facts that the filariæ may pass sometimes from the proboscis into vegetable substances.

From the investigations of the members of the Liverpool Expedition to Nigeria 14 on the bionomics of Anopheles, it is very probable that the female mosquito lives on blood alone, in fact, in the case of Anopheles costalis, and Anopheles funestus, blood is required at least every other day for the maturation of the ovary and the regular deposition of eggs, a process which was carried on in the case of some Anopheles under observation for nearly two months; there can, therefore, be no very great risk of the young filaria being lost in a fruit diet.

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# SOME REMARKS ON ASYLUM PRACTICE IN SINGAPORE.

By W. GILMORE ELLIS, M.D.Brux., M.R.C.S. Medical Superintendent, Government Asylum.

On arriving here in 1888 to take up my post as Medical Superintendent it seemed to me that I had gone back a hundred years at least. No case books; no medical journals; no post-mortem records. A register did exist, but the names of patients were unknown; the register and the numbers of the patients agreed, but that was all. There was a palatial asylum, badly drained and worse ventilated, mostly built in blocks of ten single rooms. Instead of one single room to about ten beds in dormitories, the opposite condition prevailed. Fixed bedsteads were placed throughout immediately below barred windows; proper supervision was difficult; and the Chinese patients, a most suicidal class, were prompt to avail themselves of their opportunities. Strait-jackets were in evidence, and all criminal lunatics and lunatic criminals were in leg irons. Added to the above, one had to contend with quite a babel of tongues, for four dialects of Chinese, Malay, Tamil, Hindustani, and Javanese were commonly spoken; and Burmese, Japanese, Siamese, Annamite, and several different Eastern Archipelago islanders, speaking but their own language, were all represented in the 200 odd patients I found awaiting me.

Descriptive rolls sent by the police with new patients are in many instances wrongly filled up, the answers in no way applying to the questions. The majority of the cases are wandering lunatics in, as is to be expected, the poorest of physical condition, and about whom no history can be gleaned. Relations they may have, but in China or India or Java and the many islands of the Archipelago, immigrants from which make up most of our population. But little can be done that is reliable in the way of elucidating the causes of insanity in such patients. The study of the mental characteristics of uneducated and semi-savage races is most difficult, and before any useful work can be done it is absolutely necessary that a thorough knowledge of their mode of life, their normal mental state, their theories as to witchcraft, ghosts, and dreams, and their folklore be gained. As has been noticed in India, so here, the majority of patients belong to the lowest classes, with minds unable to grasp the relations of cause and effect except in the customary affairs of life, and so constituted that anything outside their practical knowledge is, as a rule, given up as being incomprehensible.

In our admissions there has been and is a marked absence of the more acute forms of insanity, and that most prevalent appears to me but an exaggeration of a low standard of intelligence, passing fairly rapidly into a condition of dementia from which recovery is not infrequent. Again, many are admitted in a state of dementia—dull, obtuse, and indifferent to their surroundings — without having suffered from any previous acute mental disorder; here recovery also is

frequent.

Delusions and hallucinations are of a far simpler character than those met with in European asylums; the former are but rarely persisted in to any extent,

and the latter worry the patient but little.

All coolies—Chinese, Tamils, Malays, and Javanese—thoroughly believe in witcheraft, and a large percentage of my patients upon recovery assign this as the cause of their insanity. It is necessary to bear this in mind, especially when examining new admissions, otherwise the, to them, normal belief might be considered a symptom of insanity.

Cases of melancholia are somewhat rare, and never very acute. The theory held by some that mania is due to some disturbance of the lower developed portions of the brain, whereas melancholia is due to an affection of a later development, is hereby borne out. Dr. Greenlees finds a similar condition prevailing amongst his native patients in South Africa.

General paralysis of the insane is rarely if ever seen amongst Asiatics. With about 2,600 admissions during my thirteen years' residence in the East I have never seen a case, and it is not to be wondered at when we consider the simple life of the natives, their few or no worries, and the fact that there is no struggle for existence amongst them in the Straits Settlements. In a country where there is no cold, but little indulgence amongst natives in alcoholic excess, where food and lodgings are cheap, and the least possible clothing is required, a disease originating in anxiety, mental worries, and great excesses is little likely to develop. I have had three cases in whom there were some symptoms, both physical and mental, of general paralysis; in none of them did these symptoms advance, nor was the sequence of events such as is seen in that disease. Eventually the cases were considered syphilitic, and the diagnosis was verified post mortem, a diffuse gummatous deposit in the pia being found in one case, nodes and ostitis of the vault in a second, and endoarteritis of some of the cerebral vessels in the third.

The female recovery rate is somewhat low, averaging 35.29 per cent. on the admissions for the last twelve years. The recovery rate of the males over the same period has been 41.10 per cent. Possibly a factor in the low recovery rate of females as compared with the rate in European countries is the rarity of puerperal insanity. Since 1887 there have been 389 females admitted with only 1 case of puerperal insanity. During the same period 2,330 males have been admitted, showing the peculiarity of the ratio of the sexes in the Straits. The ratio of males to females in the census just taken is in the colony 662 males per 1,000, and in the settlement of Singapore 747 males per 1,000 of population.

The average admissions from syphilitic insanity has been for the past few years 6 per cent., and considering the abnormal ratio of our sexes, the fact that prostitution is considered no disgrace by the Chinese who form the large majority of our population, and above all the abolishment of the Contagious Diseases Acts, it is not to be wondered at. Many, unfortunately very many, of our admissions besides the above, show signs of present or past venereal disease, but in them the disease is probably not the cause of their

insanity.

Cases of malarial insanity are not uncommon. The insanity from this cause is usually most acute, quite distinct from delirium, usually of but short duration, and nearly invariably results in recovery. It has been rare for these patients to have any relapse of fever whilst under asylum treatment. I have the notes by me of 36 cases. Of these three have died, one from acute dysentery, one from pulmonary tuberculosis, and one from heart disease. The remaining 33 have all been discharged recovered. All were admitted noisy, dirty, violent, and destructive-temperature normal. From a few days to a fortnight after admission they became quieter, in fact, many of them became somewhat stuporous and were fed with diffi-From this condition they quickly recovered and 29 were discharged in from three to four months. The other four, three of whom had relapses of fever and insanity with delusions and hallucinations, were

discharged recovered, two in eight months, and two in from ten to twelve months. Careful blood examination showed nothing abnormal except in the relapsed cases. May not these cases be due to some substance in the circulation, and may not that substance be some product of the malarial parasite? Our knowledge as yet does not take us very far on this road, and the causes of such insanity, as above described, are, in their very nature, most difficult of detection.

Opium smoking, a common indulgence in this part of the world, has been stated by many, most of whom I should imagine to be entirely unfitted to judge, to be a frequent cause of insanity. This statement I cannot but impugn. Of about 2,600 patients whom I have admitted, opium smoking was said to be the cause of the insanity in 30. I have most carefully inquired into the history of these cases, but few of them were the emaciated opium sot—in fact, one rarely sees that being in Singapore—all had been confirmed opium smokers, but usually in moderation. I was able to make out other causes for their mental breakdown in 22 of the cases; in the remaining eight no cause was to be discovered. There were no special or peculiar symptoms in their form of insanity. Some were maniacal, others melancholic, and others demented. Asylum patients broken of the opium habit without much trouble when first admitted, having recovered and been discharged and readmitted after intervals of more than a year, upon recovery from their second attack of insanity, have assured me that during the whole time they were outside they had not smoked a single pipe of opium. I have never yet seen a person of whom I could believe, or had any grounds for believing, that opium smoking was the cause of his insanity. The morphine habit, by subcutaneous injection, is a weakness of many Chinese, but none addicted to this habit have as yet found their way into my hands. There is a Chinaman, whom I saw lately in the prison, who shows on back and arms the scars left by many years' indulgence in the habit. He has always been quite sane, and is at present free

from any craving for the drug.

The food question in an Eastern asylum is very important. Mohammedans will not eat food from a kitchen where food for Chinese has been cooked if they have the least glimmering of sense left, and Hindus will not touch food cooked by a lower caste man. Cases of refusal of food therefore must always be inquired into in detail, and not at once considered as a symptom of the patient's insanity.

What amusements to try and forward is a great difficulty, there being none of an active character so useful as aids to recovery with Europeans that I can discover attractive to Asiatics. A few play a game resembling draughts, all smoke, and a few appreciate an occasional theatrical or conjuring performance.

Native attendants are not very trustworthy nor sensible, as we understand the word. An amusing incident, which might have turned out seriously, happened in my early days in the East. The night attendant in charge of the infirmary block, who up to that time kept the key of the dispensary at night, was attacked with diarrhœa at 12.30 a.m., and attracted the attention of a Tamil imbecile named Tamby, who was sleeping in the block. Tamby was employed

daily in carrying the medicine basket around the asylum with the dresser, and, with the knowledge of drugs thus gained, imagined himself capable of treating the attendant beneficially. At his request the attendant handed him the key of the dispensary, from whence he brought out something to give his patient. The attendant at first demurred to taking it, but was persuaded by Tamby offering to take half. One-half was taken by each, and the attendant, immediately feeling very ill, was just able to call up the assistant medical officer before falling down in convulsions, Tamby being found in a similar condition. Both were seriously ill for forty-eight hours, but rapidly made uninterrupted recoveries. The above manner of obtaining the medicine was described by the attendant; Tamby denied having entered the dispensary, or having taken anything, and accounted for his symptoms by fright caused by a big black cat rushing by him. I believe chrysophanic ointment to have been the drug taken, and, from the attendant's description, probably about 60 grs., equal to 3 grs. of the acid. I have not gone into the details of their symptoms, but they were not quite those of any poison described in the text-books.

I have written on the subject elsewhere, but it may not be altogether out of place to make a few short remarks upon that mental condition, practically peculiar to the Malay race, the culminating point of which is commonly called "amok," and is a state of blind and furious homicidal mania, several cases of which have come under my notice during the past ten years. Fright, grief, a grave disease, brooding over real or imaginary wrongs, the sight of blood, malarial fever, and a peculiar condition of nervous depression, have all been noted as exciting causes. It may be that in some cases the individual wilfully works himself into a condition to amok; in others undoubtedly he passes into that condition insensibly The question for us is how far he and suddenly. should be held responsible for crimes committed when running amok. As in persons suffering from epilepsy, strongs emotions will bring on a fit due to disturbances in the motor portions of the cerebral cortex, so I believe that in some Malays strong emotions cause a disturbance in the sensory portions of their cerebral cortex, the result of which is an unconscious paroxysm of homicidal mania, or, as Maudesley calls it, an "epilepsy of mind." During this paroxysm the unfortunate individual will rush through the most crowded street or village, stabbing right and left, at man, woman, or child, relation, friend or stranger. After such an outbreak nothing is remembered that took place during it, the usual explanation on the part of the individual being that the head was giddy, and that everything appeared red, or dark, or like blood to the eyes. All men that I have examined after having run amok, at periods varying from a day to a few weeks after the incident, had a wild furtive stare, showing much sclerotic, and, when questioned as to the amok, their respirations became hurried and their pulse quickened as they gave the above explanation, or answered, "I don't know," "I can't remember." They remember that they were depressed, that they were upset, that they suffered from grief-in fact, that their affective nature was at fault, but nothing more.

I could discover nothing further abnormal, except in three or four cases in whom undoubted symptoms of insanity were present and remained. The others were tacitum and averse to answering many questions,

though perfectly rational and coherent.

I have had an opportunity of holding a post-mortem examination on three men who had run amok; in all the pia was thickened and adherent to the convolutions; no other gross changes were to be seen, and unfortunately the microscope was not used. Those who run amok from a sudden impulse are, in my opinion, quite unable to refrain from obeying that impulse, and moreover, are unconscious as to what they do whilst obedient to their impulse, and therefore should not be held responsible for any action they may commit during their paroxysm of mania—a mania that would even come under the definition of insanity as held by lawyers. Those, on the other hand, who, from some real or imaginary wrong, or any other cause, first wilfully work themselves into an uncontrolable rage and then run amok should be held, to a certain extent at least, responsible for their actions, for they must thoroughly understand what is likely to result from their first wilful action. As a man who of his own free will drinks heavily, and in blind drunken rage, more or less unconscious of his actions, commits a crime is responsible so are they.

Beri-beri is the scourge of institutions in the Straits, and for years past 50 per cent. of the mortality of this asylum has been due to it. Much work has been done, the symptoms and gross pathology are well known, and many theories have arisen and died and many yet exist as to the cause of the disease; but, unfortunately, I can end these disjointed remarks by quoting the following lines written by the late Dr. Moxon:

The suffering the patient knows;
The physical change the doctor knows;
And
The cause God alone knows.

AN EPIDEMIC OF ZINC POISONING THROUGH DRINKING CONTAMINATED WATER IN THE TROPICS.

By John D. Gimlette, M.R.C.S.Eng., L.R.C.P.Lond.

Acting Residency Surgeon, Pahang, Malay Peninsula.

The poisonous effects of various salts of zinc have been demonstrated from time to time. In England they have been reported from brass foundries as due to the oxide, and have been traced to the sulphate in the adulteration of cheese, apparently to the oxide in injurious ice creams, to the chloride in cheap wearing apparel, as well as to the carbonate in drinking water supplied by means of galvanised iron pipes.¹ Instances of the latter kind of poisoning in the tropics are perhaps not so widely known as at home. In 1900, part of an Indian regiment, the Malay States Guides, stationed at Pahang, suffered from zinc poisoning to a very marked degree.

The 56 men who formed the detachment were transferred from the neighbouring State of Perâk in March, 1900. I took over medical charge of this half-

company in September, 1900, and found that the health of the men had been very bad during the previous six months. Gastro-intestinal complaints were so frequent and serious as to almost verge on an epidemic. Route marching had been curtailed, early bathing prohibited, and it had been supposed in July that a form of dysentery was endemic in the barracks. Inquiry showed that the half-company was composed partly of Sikh soldiers and partly of Pathans, living in parallel and identical barracks on an isolated hill, a short distance from the town of Kuala Lipis, and about 43 ft. above it. The two buildings were erected in 1898 on an artificially-levelled flat, the surface of which was of stiff clay streaked with laterite. Each barrack was 90 ft. in length by 40 ft. wide, roofed in 1898 with sheets of 22 B.W.G. corrugated iron.

In 1900, for the convenience of water supply, a galvanised iron tank (capacity, 400 gallons) had been supplied to each building, one being for the use of the 31 Sikhs, the other for the 25 Pathans who made up the strength of the half-company. Rain-water was collected for the first time in January, 1900, from the roofs, by means of zinc gutters and down spouts leading into the tanks. No rain-water separators or other appliances were in use with a view of discharging the first water collected. The water supply had previously been carried from a large river at the foot of the hill.

The galvanised iron roofs had not been covered with a thatch and were not painted. The tanks only had been painted green outside and washed with cement inside. There is but little vegetation in immediate proximity to the barrack square, but the jungle soil in the vicinity of the barracks is shaded and thickly covered with vegetable and organic matter in an active state of growth and decay owing to the peculiarly hot and moist character of the climate.

In October I suspected that the cause acting so injuriously on the health of the Guides was due to the irritant action of some metallic poison, and surmised that it was some salt of zinc in combination with an organic acid or acids. By a rough application of the usual chemical tests, I found in December that the water from each tank, as well as that caught directly from the roof, contained the metal zinc in poisonous quantities, and my deductions were subsequently confirmed by special analysis.

Mr. P. J. Burgess, M.A., Government Analyst,

Mr. P. J. Burgess, M.A., Government Analyst, Straits Settlements, whose report on this water is attached, reports that the water taken directly from the roof is organically a dirty water and unfit for domestic purposes, while water taken from the tanks is, as far as organic impurities go, fit for drinking; and that the tank water held zinc in solution as the acid carbonate, 4.82 parts per million in quantity as compared to that taken directly from the roof which held 11.15 parts per million in solution.

It is thus proved that zinc existed in the water in sufficient amount to cause poisoning, and the medical history of the health of the detachment will prove that to this alone was their illness due. Similar detachments from the Malay States Guides who occupied these barracks, used water from other sources. They were under my care in 1898 and 1899. The numbers under treatment for gastro-intestinal complaints were

Lancet, vol. ii., 1897; vol. ii., 1896; vol. ii., 1893.

not very large during these two years for this class of native.

The present detachment used the zinc-contaminated water from their first arrival in March, 1900, until the end of the year, when its use was forbidden and prevented. After its use was stopped the number of patients steadily decreased. There have been no new cases of this kind, and the general health has much improved.

In 1900 colic, diarrhœa, and a spurious form of dysentery were persistently complained of. The health had never been affected in this way before, as the following records of attendance for this class of case, taken before, during, and after using this

water supply, will prove :-

From March to October, 1898, 30 men were under treatment for this class of case; in 1899, for the same months, 58 patients; in 1900, during the same period, 219 men, and, at the close of the year, it was found that 43 different individuals out of the 56 had been on the sick list on account of gastro-intestinal disorders. Nine men and one woman had been transferred on medical certificate. One patient was recommended for four months' sick leave to India; 5 others, who had constantly been on the sick list, took all the leave which was due to them; 7 voluntarily left the service on the termination of their agreements on account of ill-health, and one of them subsequently died in Selangor. Another died at Kuala Lipis. The spirit of the remaining 31 men of the original Perâk detachment was broken, and the general loss of tone was very noticeable.

During 1900—from January till April—only 22 have been treated for these complaints, and the figures are very striking when it is remembered that out of these 22 cases many have been old patients

from 1900.

A brief clinical account of six cases typical of the

prevailing sickness in 1900 is here given :-

(1) P. S., aged 25, lance-corporal, Sikh, had been an out-patient during April for "colic," was admitted to hospital on May 10th, 1900, for "dysentery," remained sixteen days, and was discharged; but was readmitted on June 30th for diarrhoa and colic, suffered from vomiting and violent retching. The vomited matter was sometimes streaked with blood. He was placed on milk diet and recovered, but was again admitted on July 30th for dypepsia and anæmia; returned to duty, but was readmitted for the fourth time on October 3rd, and was subsequently transferred to Selangor very much reduced in weight and strength.

(2) A. S., aged 25, private, a Pathan of powerful physique, was first treated as an out-patient for diarrhœa at the commencement of June, 1900; was admitted to hospital on June 28th, remained eight days on milk diet, recovered, and was discharged, but readmitted on July 24th for diarrhœa. He remained ten days, and recovered on milk diet. On October 25th was readmitted for "dyspepsia" very much prostrated in strength, and was transferred to Selangor after two months in hospital. This man's weight was taken on October 1st, 1900; it was then 129½ lbs.; again on October 15, 126 lbs.; again on

October 31st, 123 lbs.

(3) V. S., aged 27, private Sikh, a fine soldier of good physique, was admitted on June 22nd for "dyspepsia" and "diarrhea." Previous health bad, as he had been an out-patient for some time; suffered from stomatitis. He was readmitted on August 28th, and died on September 27th, 1900. He persistently complained of pain referred to the region of the stomach, suffered from violent vomiting and diarrhea, and became much emaciated. The muscles of the calves and thumbs were notably atrophied; he had no fever and no cerebral symptoms, and died of inanition. No post-morten examination was practicable.

(4) S. S., aged 27, bugler, Sikh, a young soldier, had been an out-patient for two or three days in March, was admitted on June 18th for dysentery; was readmitted on October 5th for dyspepsia. He complained of colic, diarrhea and vomiting, and also had slight hæmatemesis. Progressive loss of strength and flesh was very marked. There was no physical signs of disease. Worms were suspected, and he was given castor oil and santonin without result. On December 3rd this man's weight was 106 lbs.; on the 12th 101 lbs.; on the 28th 98 lbs. He was given alcohol and cod-liver oil without benefit, and was subsequently

transferred to Selangor.

(5) P. B., aged 23, private, a well-built Pathan, had been treated as an out-patient for colic and dyspepsia, was admitted to hospital for diarrhœa on August 1st, 1900, discharged as cured after six days; had been placed on milk and rice-water diet. Readmitted on December 31st for "dysentery," thin, emaciated and very anæmic in appearance; general febrile disturbance; griping pain in stomach; stools frequent but not offensive; contained ropy mucus and blood. Was given phosphate of soda in 4-drachm doses three times a day. He recovered and was discharged in thirteen days, but readmitted on February 15th, 1901, for general debility. General loss of flesh, but no cramps or anæsthesia was complained of. Blood poor in quality on microscopical examination; chemical examination of the urine for zinc negative.

(6) G. S., aged 26 years, private, Sikh, had been an out-patient since May 10th with "dysentery." Was admitted to hospital on May 13th for melæna, remained in the ward for five days, and recovered on milk diet; was supposed to have had ulcer of the rectum. Readmitted on October 9th with diarrhæa and melæna, recovered again in five days, but has been under treatment as an out-patient for anæmia.

This man as well as the foregoing patients was very

anæmic.

Special points of interest in the clinical histories are:—

(1) The fact that gastric symptoms predominated over nervous symptoms. It is difficult to offer any satisfactory reason as to why this should have occurred, except that it is a common experience in the East that Sikhs suffer greatly from irritative dyspepsia even under ordinary circumstances, and are not often attacked with neuritis. As far as my experience in Pahang goes, they have been notably exempt from the prevalent form of peripheral neuritis which is very commonly met with in beri-beri.

(2) The fact that all the Sikh patients had had their

diets prepared at the barracks, and had their drinking water supplied from the contaminated tank all the time they have been in the wards. This was on account of their religious custom, which forbids them to use food prepared by others than their own nationality, or to drink water unless it has been carried by a Sikh. The Pathans, on the other hand, being Mussulmans, were supplied with the ward diets and water by the hospital cook, who is a Mohammedan. They were also accustomed to eat and drink with their Mohammedan friends in the town, but the Sikh soldiers had few opportunities of feeding outside barracks. hospital returns show that the Sikh soldiers suffer in a proportion of almost 2 to 1 as compared to the Pathans.

(3) The slow and deadly action of zinc poisoning by administration in small but continuous doses was well exemplified. In some cases it seemed to suggest the possibility of zinc being an accumulative poison. Emaciation was, generally speaking, an evident symptom, and was so marked in the case of V. S. as to suggest malignant disease of the stomach at the

time of his death.

With regard to the chemical analysis of the water. it is necessary to say that the samples A and B mentioned in the analyst's report were taken from the Pathans' tank. It was not possible at the time, owing to a short drought, to send Mr. Burgess samples from the Sikhs' tank. An excess of zinc was found in this water by me as compared to the other. For the same reason it took some days to collect the sample C, which was taken directly from the roof. The surface of the corrogated iron were not flushed with rain as is usually the case. This no doubt accounts for the large amount of organic matter which was found in this particular sample, and may explain the excess of zinc in it through non-dilution of the water. The roofs at Kuala Lipis are covered with white patches of oxide of zinc.

The amount of carbonate in solution in the tank water which caused so much sickness at Kuala Lipis is comparatively small in quantity. It is less than one-fifteenth of that found in the contaminated water supplied to Cwmfelin, near Llanelly, a few years ago.

It is interesting to note in connection with the latter instance, which is reported in the Lancet of July 29th, 1893, that the Pahang water was also essentially a soft water. The occurrence of this rather rare instance of poisoning suggests the advisability of a special inquiry with regard to a possible contamination of water in the towns of Australia and South Africa, where galvanised iron roofs and tanks are used for the purpose of collecting and storing rain water; and although soil and circumstances undoubtedly play a chief part in the causation of typhoid fever in these countries, it is not unreasonable to suppose that zinc poisoning might be a factor in the causation of some of the gastro-intestinal symptoms. It appears that only after prolonged boiling and subsequent filtration water containing the acid carbonate of zinc might be harmless. It must be borne in mind, however, that the climates are essentially different, and perhaps in this may be found the determining cause of the Pahang epidemic. The mean annual temperature at Kuala Lipis in 1900

was 82.7° F., the minimum temperature 71° F.; the rainfall 96.69 inches, with an average number of thirteen rainy days per month.

REPORTS BY DR. P. J. BURGESS, Government Analyst. Government Analyst's Office. Singapore, April 12th, 1901.

Report on Three Samples of Water, and a Piece of Zinc Gutter sent for Analysis by the Resident Surgeon of Pahang.

The samples were labelled as follows: A, B, C, D, E, and Of these A, B, C, D, and E were samples of water in soldered tins. Sample B was a duplicate of A, and sample E a duplicate of D.

Samples of water A, B, D, and E, were taken from the storage tanks, and sample C was taken direct from the roof. Sample F was a wooden box, containing a piece of zinc gutter pipe.

# Experimental Results.

A preliminary determination of the quality of the samples as drinking water was made, with the results as given in the attached Report I.

From these results it is shown that the water C is organically a dirty water, and unfit for domestic purposes, while

A, B, and D, E, are fit for drinking.

These results, however, cannot be taken as true indications of the quality of the waters, on account of the time that had elapsed during the transit of the samples from the

place of collection to this laboratory.

The results obtained by the resident surgeon of Pahang, namely, that zinc was present in the water, were then qualitatively confirmed, and an estimation of the amount of the metal was made. These results are given in Report

The water held the zinc in solution as the acid carbonate, and boiling the water in an open dish led to the precipitation of zinc, as the normal carbonate of zinc. The presence of zinc in this case is, in fact, precisely analogous to the frequent and harmless presence of calcium carbonate in waters which are technically termed "temporary hard."

An examination of the zinc gutter F showed that a considerable amount of dust and fine sediment had accumulated in the gutter. When this superficial deposit was removed round patches of a white powder were found closely adherent to the zinc surface. Portions of this powder were collected and analysed, and it proved to contain: zinc, 52·1 per cent.; carbon dioxide, 20·2 per cent. This percentage corresponds to approximately a basic zinc carbonate, and the practical difficulty in obtaining the white powder free from surrounding dust would naturally lead to results showing low percentage of zinc and carbon dioxide.

An analysis of the loose brown dust in the gutter was then made, and it was found to consist approximately: matter, insoluble in strong acids, 70 per cent.; zinc carbonate, 5 per cent.; ferric oxide, 9 per cent. Moisture and other soluble matter were present. Only an approximate analysis of this dust was made, because the composition varied with the mode of removing it from the gutter. The results, however, are sufficient to show that the dust contained considerable quantities of zinc salt.

## Conclusions.

There can, from the foregoing results, be no doubt that the water under examination is contaminated with zinc, and the amount is sufficient to cause zinc poisoning by long and continued use of the water. The zinc is in actual solution in the water, and filtration would not be efficient in removing the zinc. This is shown by the quantitative results obtained on filtered and unfiltered samples of the water. (Vide Report II.)

The source of the zinc has undoubtedly been the zinc

surface over which the water has run during the collection, and the water has been enabled to hold the zinc in solution

by being impregnated with carbonic acid.

As this carbonic acid is expelled from the water the zinc is thrown out of solution, and it is to this partial purification of the water by standing, and loss thereby of carbon dioxide, that I attribute the amount of zinc in water A, B, and D, E, being smaller than it is in sample C, which was taken direct from the zinc roof.

I am inclined to believe that, provided the surface of the roofs and gutters were clean, there would be no danger of zinc pollution of the water, and that the immediate sources from which the zinc is derived are the small patches of zinc carbonate, which are found in the gutter, and which I suspect would also be found scattered over the galvanised iron roof.

These patches of zinc carbonate are formed by the action of the decomposition products of organic matter, which may have collected, and have remained lying in the gutters and on the roof.

REPORT I.

Samples.	A	В	C	D	E
Chlorine (grain per gallon)	0.56	0.700	0.560	0.28	0.420
Free ammonia (parts per million)	0.07	0.128	0.420	0.01	0.000
per million)	0.04	0.66	0.182	0.11	0.104

REPORT II.

Samples.	A, B	C	D, E
		52.80	45.70
Total solid residue in filtered water (parts per million)	46.00	34.20	16.00
Zinc (parts per million)	4.82	11.15	3.35
Zinc, in filtered water (parts per million)	4.25	8.90	2.20
Iron (parts per million)	7.09	19.36	2.80

The remainder of the solid residue consisted of organic matter, salts of sodium and potassium, and traces of lime.

# THE OCULAR LESIONS OF LEPROSY.

# By M. T. YARR, Major, R.A.M.C.

A COMMUNICATION on this subject was read at the recent Pan-American Medical Congress, held at Havana, by Dr. Patron-Espada, of Yucatan. The following are the more important points to which he draws

Leprous lesions are almost exclusively confined to the anterior segment of the eye. The cornea may be attacked either by discrete lepromas or by a general interstitial infiltration; these diseased conditions sometimes give rise to a secondary glaucoma. The iris is occasionally the seat of a hitherto undescribed manifestation-numerous grey spots the size of small pins' heads, without surrounding inflammatory reaction or alteration in the colour of the unaffected iris; this peculiar form of iritis is occasionally, not commonly, followed by synechiæ. The author also describes the usual plastic iritis, and the lepromas of the iris and ciliary body, so often seen in lepers. He states he has found no retinal or choroidal lesion in the numerous cases he examined. Dr. Finlay, of Havana, in commenting on the paper, said 60 to 70 per cent. of

the patients in the Havana leper asylum presented ocular lesion, and drew attention to the importance of loss of eye-brows as an early premonitory sign of ocular complications.

Dr. Patron-Espada is incorrect in stating that the "miliary iritis" above alluded to had not been previously described. In the exhaustive monograph on Ocular Leprosy, by MM. Jeanselme and Morax, a translation of which I published in 1899, the following

passage occurs :-

"In two of our patients we observed a form of iritis which we have not seen previously described, and which seems pathognomonic of leprosy. The surface of the iris in these cases appeared speckled with tiny grey points which could only be made out distinctly with the aid of a lens; these spots were scattered all over the iris, but were much more numerous near the sphincter; on a small scale they resembled the eruption of miliary granulations seen in certain forms of tubercular iritis. In one case the pupillary reaction was normal; in the other there were strong posterior synechiæ. In a third patient the same miliary nodules were present, but limited to a small area of the iris."

The assertion that leprous lesions are almost exclusively confined to the anterior segment of the eye is probably only correct clinically: I mean that fundus lesions are by no means unknown, but it is very unusual for observers to diagnose them during life as corneal opacities and pupillary exudates so frequently render ophthalmoscopic examination impossible, An interesting case in which choroido-retinal changes were detected during life was recorded in these columns

in the Journal of October, 1899.

# THE CONTAGION OF TRACHOMA.

STRAUB (Klinische Monatsblütter fur Augenheilunde) endeavours to show that trachoma is very contagious amongst children and only slightly so amongst adults; in other words, that the predisposition to the disease diminishes with advancing age.

Hoppe, in the same journal, contests Straub's conclusions vigorously. He examined the entire population of certain villages in Eastern Prussia where trachoma is rife and obtained the following statistics:—

From these figures it is seen that the proportion of trachomatous persons to the general population is not at its highest at or before the school period, but some years after its termination, the curve of incidence in Hoppe's full figures showing the maximum between 18 and 21 years. The rarity of new infections after 21 is explained by the fact, according to Hoppe, that the principal source of infection must be traced to the family and to living with infectious persons.

<sup>&</sup>quot;The Ocular Manifestation of Leprosy," by MM. Jeanselme and Morax. Translated and edited by M. T. Yarr, F.R.C.S.I. (Bale, Sons and Danielsson, Ltd.).

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THE

# Journal of Tropical Medicine

DECEMBER 16, 1901.

# FITNESS FOR TROPICAL LIFE.

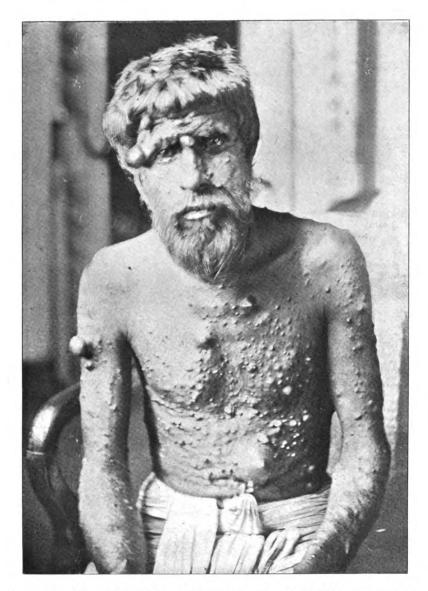
AT the meeting of the Medical Society of London, on Dec. 9th, Dr. Alexander Crombie, Lieut.-Colonel, I.M.S. (retired), brought up this subject for discussion. Dr. Crombie's long acquaintance with the European in India entitles his remarks and opinions to respect, and the valuable information he communicated to the Society was duly appreciated. He stated that climate as climate takes but a small part in the etiology of disease amongst European immigrants to the tropics. It is rather the accidents incidental to life in the tropics that bring illness, and were such diseases as cholera, malaria, &c., eliminated from the tropical and subtropical zones, the mortality statistics of the tropics would compare favourably with those

Dr. Crombie was careof temperate climates. ful, however, to state that this was true only for a time. For a time the healthy European was capable of resisting the baneful influences of excessive heat and moisture; for a time, in fact, the heat serves as a stimulant. It increases the activity of the chylopoietic viscera more particularly; it heightens even mental activity and so-called vital energy; but only for a time. In course of time a perceptible alteration appears; and amongst the less physically fit it appears The balance between thermogenesis and thermolysis is the physiological factor which the body of the European is called upon to main-In high atmospheric temperatures but little thermogenesis is necessary, and the question of the disposal of the body heat produced under such circumstances comes to be one of considerable physiological difficulty.

When the temperature of the air approximates the normal temperature of the body radiation of heat from the body diminishes, and when the temperature of the air exceeds the body temperature all radiation of heat ceases and the balance of the economy, as regards heat, is controlled by the nervous system. But the calls upon the nervous system in time tends to exhaustion, and the inevitable result is digestive upset.

To lowered power of digestion succeeds the train of symptoms which is but too well known in warm climates: neurasthenia, dilatation of the stomach, tendency to sleep after, or even at, dinner, when reading, or at any period of the day, be the occupation what it may. A craving for food, yet a repugnance of the same, a desire for alcohol, for aerated waters, &c., all indicate a lowered vitality and perversity of function.

Dr. Crombie particularly warns obese people against going to the tropics, and those possessed of inherited or acquired mental instability. Concerning the latter it is peculiarly important that the family history of candidates for the Indian Civil or Forestry departments should be carefully enquired into. In the Civil Service the long and severe mental application necessary before obtaining a place in the service, together with great responsibility afterwards at an early age, and



A CASE OF MULTIPLE FIBROMATA IN A NATIVE OF INDIA.

By T. FREDERICK PEARSE, F.R.C.S.Eng.

The accompanying illustration shows a case of Multiple Skin Fibromata in which the greater part of the body was covered by these curious swellings. They were of various sizes ranging from a pea to a small orange, and some were rounded, firm, and tough, while others were soft and elastic. They were all freely moveable. The majority were sessile, but a few were pedunculated. The subject was a Mohammedan native of India, aged about 40 years. He said that he had had these tumours more or less since he was ten years of age, and that his mother was similarly afflicted. The cause is put down to a burn. It is worthy of note that there are comparatively few on his legs, but on his head, trunk, and upper limbs the skin is almost completely occupied with them. In addition he has a tumour the size of a small cocoanut at the back of the right hip, freely moveable, distinctly circumscribed, smooth, but very hard. This he had had almost as long as the skin tumours. There is not the slightest appearance or condition to suggest that these tumours are connected with the lymphatics, and the entire absence of pain or tenderness as well as their very extensive distribution, viz., involving nearly every inch of skin surface, is surely against their association with nerves. The man's general health appears good.

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frequently trying isolation, combine to try the mental stability, and where there is any suspicion of deterioration in this respect such men ought not to be allowed to enter the service. In the Forestry department a life of isolation, and want of contact with Europeans for long periods together, is calculated to develop insanity in men whose mental balance tends towards unstableness. In fact, the only man who can with safety be sent to the tropics, and who can maintain good health for a time, is one in whom no flaw exists in his mental or physical condition.

The effect of this upon the nation has to be thought of. Only the strong men are taken; the physically or mentally unfit are left behind. We may well ask in what condition are the strong young men we give to serve the Empire sent back to us. Are we draining the strength of the nation beyond its powers to supply our Imperial needs? Tropical life is well enough for a time, but beyond that time, whatever its duration is, what then? This, however, is a question with which those who provide the supply of candidates for the public services have not to do; but it is one which we, as a people, having regard to the national health, may well carefully weigh.

# ANOTHER LIVERPOOL MALARIAL EXPEDITION FOR WEST AFRICA.

On Saturday, November 30th, Mr. Charles Balfour Stewart, M.B., who has been engaged in research work for some years in the Thompson-Yates Laboratories and elsewhere, sailed for West Africa in order to study malaria under the auspices of the Liverpool School of Tropical Medicine. He will first proceed to Freetown, to study the methods at present employed there with marked success by Dr. Logan Taylo, and will then endeavour to cope with the disease in Cape Coast Castle, where it is said to be responsible for a considerable mortality among Europeans at the present time. He will have full charge, under Major Ross's directions, of the operations on the Gold Coast, and will probably before long be furnished with assistants. His methods will mainly be those which have already been found satisfactory in Freetown and other places, viz., drainage of the ground, and the removal by gangs of workmen of broken vessels and other articles in which water can lodge about houses, and form breeding-grounds for mosquitoes, and attention to the general sanitary conditions of the locality.

Mr. Stewart has been engaged by the Liverpool School for one year, but he will probably remain as long as his services are required to carry on the work in the important Gold Coast Colony. After a short time he hopes to be able to pay special attention to the health conditions of the gold mines, and the School has instructed him to visit the mining districts where possible.

His movements will, however, be largely determined by the wishes of the Governor of the Gold Coast. Anti-malaria operations will then be in full swing all down the West Coast of Africa, from Gambia to Lagos, three of the colonies, Gambia, Sierra Leone, and the Gold Coast, being dealt with by the Liver-

pool School of Tropical Medicine.

Mr. Stewart, who was formerly a student and a house physician in the Liverpool Royal Infirmary, has already had a considerable experience of practice in tropical regions, having worked both up country in India at the plague, and in the Malarial Research Laboratory, at Bombay, where he was assistant to Haffkine. For this work he received the thanks of the Governor and Council. Since his return to England he has been engaged in the preparations of plague prophylactic serum, by request of the Secretary of State for War, and the Agent-General of Cape Colony. He would have sailed for the West Coast a fortnight earlier had it not been for the occurrence of a few plague cases in Liverpool, where his services were specially retained by the Liverpool Corporation, to assist in coping with the disease.

# Acws and Notes.

SIR FRANCIS LOVELL, K.C.M.G., arrived in Bombay on November 13th. The public papers in India have extended a hearty welcome to Sir Francis, and there is every prospect that his mission on behalf of the London School of Tropical Medicine will be eminently successful in India.

MEDICAL HONOURS IN INDIA.—We beg to congratulate the following recipients of honours which appeared in the Gazette of India Extraordinary, on November 9th:—

INDIAN EMPIRE COMPANION. George Hart Desmond Gimlette, I.M.S.

KAISER-I-HIND GOLD MEDAL. Lieut.-Colonel James McCloghry, F.R.C.S.I., I.M.S., Civil Surgeon, Karachi.

Major Herbert Edward Deane, R.A.M.C., Special Health Officer, Calcutta.

Captain Edmund Wilkinson, F.R.C.S., I.M.S., Deputy Sanitary Commissioner, Punjab.

Kaiser-I-Hind Silver Medal. Captain John Norman MacLeod, M.B., I.M.S., Civil

Surgeon, Bikanir, Rajputana.
Miss J. Yerbury, M.D., Lady Lyal Hospital, Agra,

North-Western Provinces.

Assistant-Surgeon Julius Augustus Lobo, Residency Assistant Surgeon, Persian Guif.

The following appointments have been made in the Medical Staff in India: Surgeon-General Price, to

officiate as P.M.O., His Majesty's Forces in India; Surgeon-General Eaton, to officiate as P.M.O., Bombay Command; Colonel Burnett, to officiate as P.M.O., Bengal Command.

CHOLERA.—An outbreak of cholera prevailed in Oudh during the month of November. Cholera so late in the season is exceptional, and the advance of the cold weather is sure to curtail the disease. Lucknow appears to have been the city most seriously affected, twenty to forty deaths from the disease having occurred daily for some days during the second week of November. Lucknow would appear to be sadly behind as regards sanitation, and the recent outbreak may hasten the completion of the drainage scheme which has been contemplated for some time.

# Current Miterature.

# DYSENTERY.

# DYSENTERY IN THE PHILIPPINES.

BY M. H. BOWMAN, M.D. Acting Assistant Surgeon United States Army.

The article of Dr. Cruikshank in the New York Medical Journal for March 9th and 16th regarding the treatment of acute dysentery impels me to give the Journal some observations on dysentery in the American army of occupation. If the "specific treatment of acute dysentery" has been discovered at last, it is one of the greatest boons which have ever fallen to nations. The mortality from this disease during the civil war was probably not greater than it is under similar conditions at the present time. Witness its frightful mortality for the last twenty years in Japan, and the report just published by Assistant-Surgeon R. P. Strong: "Of 1,830 cases of dysentery admitted into the First Reserve Hospital in sixteen months, not more than one-third (621) have been returned to duty." It would be interesting to learn the subsequent history of this gallant remnant as to how many have had relapse, since it is notorious that the amæbic form is prone to recur time and again after apparent recovery. The researches of Assistant-Surgeon Strong, President of the Board of Investigation of Tropical Diseases in the Philippines, have been of such a character that it can be said :-

(1) Dysentery as it is seen here is not a single, but two distinct and separate diseases.

(2) Acute dysentery is caused by the bacillus of

Shiga.

(3) Acute dysentery does not produce abscess of the liver, nor does it produce ulceration of the colon. Its fatal result is due to inflammation of the bowel, rapid elimination of the water fluids of the body, toxemia, and exhaustion, much after the manner of cholera, though requiring four, six, and twelve days before its termination or crisis.

(4) Amobic dysentery differs from acute dysentery anatomically, pathologically, and etiologically. The only similarity between them is, the colon is the locus minoris resistentiæ for both the bacillus of Shiga and

the amœba. Here all similarity ends. The bacillus of Shiga leaves no other lesion behind, save its effect upon the mucous membrane of the colon and enlargement of the adjacent glands. The amœba of dysentery invades the three layers of the colon, producing punched out ulcers or ulcers with undermined edges. It also passes to the liver and produces characteristic lesions. There are two varieties of the amœba which differ in no respect save as to size. The pathogenic variety is somewhat larger than the non-pathogenic. These two varieties of amœba have been the cause of all the confusion regarding the amœba as an etiological factor in amœbic dysentery. After the publication of the work of Councilman and Lafleur, observers discovered amœbæ in non-dysenteric cases, and at once cast doubt upon the correctness of the above-named observers. The researches of Lieutenant Strong have been of very great value in clearing the troubled waters of doubt about these Until very recently the trend of medical thought has been towards the conclusion that the ætiology of dysentery was due to no one micro-organism in particular, but the resultant energy of a combined attack, that the amœbæ were accidental factors in the disease, and not an etiological one.

At times amœbæ have been found in liver abscesses; again, they have been absent while various other micro-organisms were present, which only added to the general confusion and doubt. The liver abscess is not a true abscess. In no sense does it resemble an abscess produced by pus-producing organisms. Hence it is an abscess from which all pus-forming bacteria may be excluded as an etiological factor. In his experiments upon cats, animals very susceptible to amorbic dysentery, Strong found that amorbie from non-dysenteric cases produced no effects upon them, while the amœba from dysenteric liver abscesses, in pure culture, invariably produced the characteristic colon lesions of amœbic dysentery. These observations have been previously made by other investigators. The chief value of Lieutenant Strong's observations has been to separate the amœbæ into the pathogenic and non-pathogenic, eliminating the confusion which had grown up about the amœba in non-dysenteric He has also confirmed Shiga's observation regarding the Bacillus dysenteriæ.

TO SUM UP THE DIFFERENCE BETWEEN ACUTE AND AMŒBIC DYSENTERY.

Acute dysentery is caused by the bacillus of Shiga, a bacillus belonging to the typhoid group. It is constantly present in acute dysentery, and is the only persistent organism present. The bacillus of Shiga has produced typical acute dysentery in man, given in free culture, by the mouth, and been recovered from the stools. The bacillus of Shiga is not pathogenic to any of the lower animals, whether given by the mouth or injected per rectum. It is pathogenic, when injected subcutaneously or intraperitoneally into mice, rats, and guinea-pigs, and causes death by toxemia. The blood serum of those attacked with acute dysentery almost invariably agglutinates the bacillus of Shiga. The period of incubation is fortyeight hours. The onset of the attack is sudden and fulminating in character. The brunt of the attack is

on the colon. It never produces ulceration of the colon or of the liver. Its fatal result is due to infection of the mucous membrane of the colon, rapid elimination of the fluids of the body, toxemia, and exhaustion. The bacillus of Shiga is not found in amœbic cases of dysentery. The brunt of the attack may be at the hepatic flexure, the splenic flexure, or the sigmoid flexure of the colon, or the whole extent of the colon may be filled with ulcers like a sieve. These varied locations have often been observed by the writer while doing post-mortem work in China. The abscess of the liver may be single or multiple. I have observed them more frequently multiple than otherwise. The blood serum of those attacked with amæbic dysentery does not agglutinate the Shiga bacillus. As to just what part the accessory bacteria play in both the acute and amoebic forms of dysentery it is impossible to form a conjecture. It is equally difficult to estimate the rôle of the colon bacillus and the staphylococcus in a case of typhoid fever. But we accept the typhoid bacillus as the main factor in this affection. It is also as clearly proved that the bacillus of Shiga and the amœbæ are the fundamental factors in the production of their respective lesions in dysentery. Acute amobic cases of dysentery often, run a rapid course. Symptomatically, it is difficult to distinguish between this and acute dysentery, but microscopically, the amœbæ are found often in great abundance. In these cases it is surprising with what rapidity the amœbæ burrow into and produce large patches of multiple abscesses of the colon, of the size of the hand or half its length. In these areas there may be a patch of the size of a dollar or many times larger of broken-down gangrenous intestine with one or more perforations. There is another picture of this disease which is seen particularly in the robust and strong men, those in whom we least expect to find serious trouble. They usually come on sick report for a trifling diarrhœa, and the usual treatment is given. In a few days they return to duty, feeling perfectly well. They do not lose flesh, and they have not the appearance of being sick. There are alternately a diarrhea of a few days' duration and a variable period of normal condition or, rather, of constipation. A brief history of one of these cases will show the insidious character of this form of amæbic dysentery, from which a very large percentage of the

men are disabled and have to return to America.

Private B., Company E., Sixth U.S. Infantry, arrived in Negros from the United States in July, 1899. In July, 1900, was in hospital one month for diarrhæa; returned to hospital in November, 1900, for diarrhæa; in February, 1901, was again in hospital for diarrhæa, returned to duty in a week, and came to hospital May 26, 1901, for diarrhæa. This is the history given by the patient, and not the diagnosis from hospital records. He weighed 160 lbs., had a good colour, had lost no flesh, and from outward appearances was in the best of health. Physical examination showed the left lobe of the liver decidedly enlarged. The abdomen was normal, with no pain or tenderness on pressure. The stools were disagreeable, foul-smelling, with considerable blood and mucus. Microscopical examination showed large numbers of amæbæ. Some of the amæbæ con-

tained as many as fifteen red blood-corpuscles. The temperature was subnormal in the morning, with an elevation of from a half to one degree in the evening.

During the periods of constipation there is likely to be jaundice; especially is the icteric tint observed in the eyes. The digestion does not suffer until late in the disease. When digestive disturbances supervene the patient fails rapidly. This is the common history of a very large percentage of those who are attacked with amœbic dysentery. A rigid examination of the stools in every case of diarrhea is the only possible way to detect these latent and insidious forms of

amœbic dysentery.

With the evidence here before us of the unquestioned duality of the disease proved beyond cavil by the anatomical lesions, the experimental work with the bacillus of Shiga and with the amœba, as well as therapeutical experience, it is something of a surprise to read Dr. Cruikshank's insistence upon the unity of the disease and the specificity of treatment. The citation of Dr. Buchanan Smith and Dr. Dickey's experience with the sulphate of magnesium treatment affords little ground upon which to base an argument; 555 cases treated with magnesium sulphate, with only six deaths, looks well in print. In none of these cases was there a microscopical examination or were cultural growths taken. The so-called catarrhal form of dysentery is often mistaken for acute dysentery. In this catarrhal form the patient usually recovers, whether he is treated or not. The 555 cases cited were probably of this nature. At most, it is hardly fair to insist upon our accepting them all as acute dysentery upon the evidence submitted. The recovery from acute dysentery depends upon three important factors: (1) The virulence of the bacillus of Shiga; (2) the physical condition, susceptibility or non-susceptibility of the individual; (3) nursing, nourishment, and rest.

If the bacillus is particularly virulent, the patient will as surely succumb as if he had a virulent type of cholera. If it is not so virulent, and the patient is in poor physical condition, he will hardly sustain the attack, but if he is in fair physical condition and properly cared for, his chances for recovery are good. There are undoubted degrees of susceptibility among the soldiers, as well as degrees of virulence of the organism itself. We owe much to this fact.

# TREATMENT.

Medicine in no way seems to influence the course of the disease. It runs its course to the end. We have no power as yet to abort the disease. To sustain the patient through the attack seems to be the only rational treatment. To aid in depleting his system of all the fluids of the body, as the disease itself is doing, is no more rational than to make use of the same means in the treatment of cholera. Hypodermolysis and rectal enemata of mild astringents and sedatives are of unquestioned value. Amæbic dysentery, on the other hand, presents to us both a darker and a brighter prospect than the acute form. If it is recognised in its early stages before the annæbæ have penetrated deep into the tissue of the intestine, and possibly entered the circulating channels and reached the liver, it offers much hope, but if rapid

ulceration is forming, it is a question whether we can reach the amæbæ and arrest their progress before perforation or necrosis takes place. If the amæbæ invades the liver, few patients recover from the almost necessary operation which sooner or later must follow. In this form of dysentery magnesium sulphate is not indicated. Quinine solution effectually destroys the If the attack is severe, the condition of the intestine is such that it can scarcely retain the solution, the remedy proves useless. Many cases, however, are on record in which quinine solution proved highly efficacious, and its therapeutic action is unquestioned. In contrast with this gloomy prognosis comes the reassuring note from Dr. Cruikshank about the aperient sulphates. In what way can the sulphates affect the amœbæ or the bacillus of Shiga?

Beneath the adherent mucous exudate upon the surface of the colon, in acute dysentery, the bacillus of Shiga can never be removed or influenced by aperients or purgatives. In the amœbic form the amœbæ bury themselves in the submucous and muscular tissue of the colon, and are as little influenced by aperients as is the typhoid bacillus which, having entered the walls of the intestine, has passed on to the mesenteric glands and spleen. It is agreed, I infer, that the intestinal canal cannot be disinfected. It would be a grievous mistake to make use of this remedy in cholera, yet the condition of the colon in the acute dysenteries contraindicates the use of the sulphates more decidedly than it does in cholera. Since the colon is pathologically more gravely affected than the intestines in the latter disease, they the more loudly call for rest. Finally, the aperient sulphates have been tried time and again and found wanting in every particular. Regarding the dysenteries produced by the Shiga bacillus and amœbæ, I submit the following considerations :-

(1) The duality of dysentery is proved.

(2) Acute dysentery is the result of infection with the bacillus of Shiga.

(3) It is infectious in the same way that the bacillus of typhoid fever is infectious.

(4) Amæbic dysentery is caused by an amæba.(5) There are both a pathogenic and a non-pathogenic amœba, which fact has produced much confusion regarding the amœbæ as an etiological factor.

(6) The lesions of amœbic dysentery differ from those produced by the bacillus of Shiga.

(7) The therapeutic agents generally used for the treatment of acute dysentery are in no way curative.

(8) Magnesium sulphate should be included in this list.

(9) Quinine solution is a specific for the amæbic dysentery, but its employment in rapid, acute, ulcerating cases is fraught with dauger, and from the nature of the lesions it cannot be retained for a sufficient length of time to produce beneficial effects .-New York Medical Journal.

THE Government of India intend establishing a large bacteriological research institute with a laboratory at Parel, under Dr. Haffkine, who will be known as Director of Bacteriology.

### EXCHANGES.

Annali di Medicina Navale.

Archiv für Schiffs u. Tropen Hygiene.

Archives de Medicine Navale. Archives Russes de Pathologie, de Médec., Clinique et de

Bacteriologie. Australasian Medical Gazette.

Boletin de Medicina Naval.

Boston Medical and Surgical Journal.

Bristol Medico-Chirurgical Journal. British and Colonial Druggist.

British Journal of Dermatology.

British Medical Journal.

Brooklyn Medical Journal.

Caducée. Climate.

Clinical Journal. Clinical Review.

Giornale Medico del R. Esercito.

Hong Kong Telegraph.

Il Policlinico.

Indian Engineering.

Indian Medical Gazette. Indian Medical Record.

Janus.

Journal of Balneology and Climatology.

Journal of Laryngology and Otology.

Journal of the American Medical Association.

La Grèce Médicale.

Lancet.

Liverpool Medico-Chirurgical Journal.

Medical Brief.

Medical Missionary Journal.

Medical Record.

Medical Review.

Merck's Archives.

New York Medical Journal.

New York Post-Graduate. Pacific Medical Journal.

Polyelinic.

Public Health.

Revista de Medicina Tropical.

Revista Medica de S. Paulo.

Sei-i-Kwai Medical Journal.

The Hospital.

The Northumberland and Durham Medical Journal.

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2.—Manuscripts sent in cannot be returned.

3. - As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

4.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

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# Yournal of Tropical Medicine

A BI-MONTHLY JOURNAL DEVOTED TO MEDICAL, SURGICAL, AND

GYNÆCOLOGICAL WORK IN THE TROPICS

#### EDITED BY

JAMES CANTLIE, M.B., F.R.C.S., AND W. J. SIMPSON, M.D., F.R.C.P.

#### VOLUME V.

JANUARY 1, 1902, TO DECEMBER 15, 1902



#### LONDON

JOHN BALE, SONS & DANIELSSON, Ltd. 83-89, GREAT TITCHFIELD STREET, OXFORD STREET, W.

COLONIAL AGENTS-GORDON & GOTCH, MELBOURNE, SYDNEY, BRISBANE, WEST AUSTRALIA, AND CAPE TOWN.

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#### Original Communications.

## SNAKE POISONING IN CENTRAL AFRICA.

By NEIL MACVICAR, M.B., C.M.Edin.

Late Medical Officer to the Church of Scotland Blantyre Mission, British Central Africa.

Case I.—Native man, aged about 35, a tall, slender, active man, was bitten by a snake about four feet long on January 11th, 1899, at about 5 p.m. He killed the snake, but it had bitten him in two places on the back of the right hand. Quickly the hand swelled and became very painful. He walked a little way (to his house) and then lay down. That night he slept well, but during the night he began to pass blood on micturition. All through the act only blood came, and that in large quantity and with little pain. The hand meantime was swollen and bleeding. On the 12th there began to be pain in the epigastrium and both hypochondriac regions. This became so severe that during the night of the 12th he had no sleep. He continued to pass blood. 13th: Was brought to hospital in the forenoon.

State on Admission. - He cannot walk, but this is from weakness. There is no paralysis. He is intelligent and can talk without difficulty. The hand is greatly swollen. The places bitten can be easily seen, they are both on the back of the hand and are about 3 in. apart. At each place there are visible the marks of the fangs—two tiny cuts parallel to each other, and about  $\frac{1}{10}$  in. in length. Blood still exudes from the bites and does not coagulate. Examined with the microscope this blood seems normal. The red blood-corpuscles are well formed; the leucocytes are plentiful and are moving freely.

There is constant, severe pain in the epigastrium and in both hypochondria, and on attempting gently to palpate the liver and spleen the pain produced is unbearable. He has eaten nothing since he was bitten.

There is no pain in the region of the bladder. He passes abundant urine mixed with blood. Microscopically examined it is seen to contain numerous red blood-cells, most of them "ghosts," empty of their hæmoglobin. No casts; no ova of Bilharzia; one or two cells of bladder epithelium.

The patient is also coughing and expectorating blood. This, he says, began yesterday.

From the activity of the leucocytes that were emerging from the wound, I judged that the poison was no longer very abundant locally. I therefore merely applied a simple antiseptic dressing. Hot belladonna fomentations were applied round the liver, stomach and spleen.

14th.—Blood count made in forenoon. Result, 5,350,000 red blood-cells per cm. Not a single leucocyte seen in 160 squares. To-day is keeping nothing down. Is constantly vomiting a watery, slightly bilious liquid. (He was not vomiting on admission.) My notes are not explicit on this point, but I think the vomiting began when he attempted to take liquid nourishment after admission on the 13th. 6 p.m.: Has been vomiting all day. Two motions, almost pure blood. Has passed urine five times, looking almost like pure blood. Last time the amount was three ounces. Coughing a good deal, some red blood. Liquid extract of ergot, 1 drm., was kept down a short time and then vomited. 11 p.m.: Pulse 88, regular but flopping, a bad pulse. Temperature 97 6° (see chart for course of temperature). Pupils normal, react to light. The pain in

SNAKE BITE.—CASE I. TEMPERATURE CHART.

1899. Jan.	15	16	17	18	19	20	21	22	28	24
Forencon Afterncon	98·2 99·8	97 98·4	96 100·8	98·4 99·6	97·7 99·9	100·2 97	98.2	99·4 100·2	97·3 100·1	97

the liver persists in spite of belladonna fomentations. Has now almost constant hiccough.

I injected 10 cc. of Calmette's serum, which, though

of date 1896, appeared clear and good. Injected slowly under the skin of the right flank. I watched the case closely for about an hour, but could detect no

change one way or another.

15th, morning.—Worse. Pulse 140, weak. Has been hiccoughing and vomiting all night. Has passed a lot of blood both by bowel and in urine. 3 p.m.: Still hiccoughing and vomiting constantly. Can keep nothing down. Pulse cannot be counted, but seems about 140. Whisky hypodermically brought back a countable pulse, 116, but very weak. Condition of

patient could not well be more grave.

Thinking that the vomiting might be due to the efforts of the gastric glands to eliminate the poison, or might possibly be uræmic, I decided to try whether assistance could not be rendered to the stomach by the action of the sweat glands. I therefore gave <sup>1</sup>/<sub>10</sub> gr. of pilocarpin, and watched anxiously what effect would follow. There occurred slight perspiration, and, I thought, a decided increase in the quantity of the watery vomit. The patient vomited about three pints in half an hour. The pulse remained unaffected.

The blood: Hæmoglobin estimated at between 50 and 60 per cent. of the normal. Microscopically examined: Leucocytes seem very numerous. count made. The red corpuscles are mostly of uniform size and of normal appearance, but there are a

few very small ones. Blood is still passing by the bowel. Belladonna

fomentations over liver continued and poultice over kidneys. Evening: Patient looks very ill. Pulse hardly countable. Still vomiting. Is asking for tea,

and thinks he can keep it down.

16th, morning.—During the night patient slept a good deal and vomited only twice. Had tea repeatedly and did not vomit it. This is the first thing he has retained since he was bitten. No motion during the night, but urine still full of blood. Pulse much better —108. Still taking tea in cupfuls. No vomiting, though still some hiccough. 6 p.m.: Vomiting a little. Urine becoming clear. One motion black and containing some red blood. Complains of great pain in the epigastrium and up the centre of the chest, probably in the gullet due to retching. Can eat nothing, but takes tea.

17th.—Steadily improving. Able to take flipped eggs and milk. No vomiting. Liver not enlarged in any direction. Still painful.

18th.—Slept well. No vomiting. Pain in liver

less severe. Urine quite clear. Pulse 84.

20th.—Quite well except for pain at site of antivenom injection. Pulse 72, good.

22nd.—Left well.

The snake was said to be the "nsongo" (Yao language) or "mbobo" (Mang'anja language). Unfortunately I could not procure it. This "nsongo" is, however, generally regarded as rather mythical. Natives say of it that "it crows like a cock," but when pressed, they admit that they have never seen it. This patient, however, says quite decidedly that he was bitten by an "nsongo."

Case II.—Native man, aged about 20. On May 29th, 1897, was bitten by a snake in the foot. Snake not seen. Immediately there occurred great pain and swelling. At night could not sleep on account of the pain, but had no constitutional symptoms. Able to

30th.—Walked to hospital, about three miles. Pain and ædema now extend up to knee. At the place bitten, on the dorsum of the foot, there is only one scratch, about ½ in. long. I think the snake must have struck obliquely so that one fang missed and the other slanted off, instead of penetrating deeply. The wound seemed so superficial that I simply dressed the foot and leg with a belladonna fomentation.

June 2nd.—Swelling of leg down, but swelling of foot continues, and patient complains of great pain, and thinks a fang is embedded. I cut across the

place and found no fang.

3rd.—A brown discharge of altered blood came from the wound to-day. Pain and swelling continue.

6th .- Pain and tenderness at the wound considerable. Swelling gone.

8th.—Pain gone. So almost well. Went home. Some tenderness. Wound

11th.—Returned. Wound open again. Pain.

14th.--Wound healed, but still painful. Not seen

Case III.—Native man aged about 20. This patient was bitten in the hand with what appears from his description to have been a puff-adder. He says he was very ill with internal pain and with swelling and pain of the whole arm. A fortnight after the bite he came under my care.

The thumb was black and gangrenous and attached to the hand by the bare metacarpal bone and the naked tendons. The whole hand was much swollen and covered with foul sloughs, from beneath which pus exuded. The skin of the back of the hand was dead. The fingers could be moved a little and had

some sense of touch.

After removal of the dead thumb and sloughs from the hand, the surface granulated and healed well, the patient retaining the use of his fingers to a slight extent.

Note.—I have seen a number of other cases of snake-bite in natives and one in a European, and all of them were more or less like Case II., local pain and swelling being the chief symptoms. I have never seen a fatal case. My experience has, however, been limited to the Shire Highlands where the snakes are not so venomous as they are said to be in parts of the country that lie at a lower level.

I recollect seeing one case of acute conjunctivitis in an out-patient which was said to have been caused by a "spitting" snake. Having myself seen specimens of this snake (in the possession of Dr. Stephens) I can well understand how the accident might happen. The snake is a small one, and when irritated it squirts

a fine shower of venom at its adversary.

Case I., I think is of especial interest. It seems to be the case that in the venom of all poisonous snakes there exists a constituent which has the power of destroying blood-cells (both red blood-corpuscles and leucocytes), and which also acts on the plasma, so that if introduced rapidly (e.g., into a vein) it causes extensive clotting, but if introduced slowly (e.g., subcutaneously) it destroys the normal coagulative power of the blood (Dr. C. J. Martin). It also acts upon the capillaries, so damaging them that they give way and allow of extravasations (Dr. Weir Mitchell).

This constituent, though present in the poison of all poisonous snakes, is met with only in very small quantity in the poison of most colubrine snakes, while in the poison of Indian vipers it is present in sufficient quantity to produce marked hæmorrhagic symptoms, these symptoms supervening after the patient has recovered from the earlier symptoms of prostration and paralysis (Allbutt's "System of Medicine").

In my case the hæmorrhagic symptoms were of the gravest kind and were of late occurrence, the destructive action of the poison continuing with increasing

virulence until the fifth day.

Snake venom is said to be excreted by the kidneys and perhaps also by the salivary glands. This case seemed to suggest that the gastric glands were performing a similar function.

Case III. illustrates the well-known tendency of snake wounds to cause extensive suppuration, the consequence, no doubt, both of the loss of germicidal power of the serum and of the septic condition of the snake's teeth.

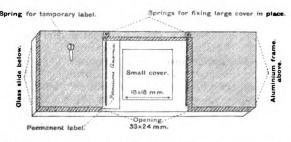
As regards treatment, I afterwards regretted that in both Cases I. and II. I had not at once incised the places bitten and dissected out the damaged subcutaneous tissue immediately beneath the fang marks, as I would have done had I seen the cases early. Even in cases that come late for treatment it is well to remove this damaged tissue, in which presumably any of the poison that remains still unabsorbed will be lying. Permanganate of potash may then be rubbed into the wound.

## CAN WE DO WITHOUT SLIDES?

By EDWARD HORDER, F.R.C.S.Edin.

MESSRS. ZEISS, of Jena, and 89, Margaret Street, London, have made for me an aluminum frame, the object of which is to obviate the necessity of carrying a large number of the usual  $3 \times 1$  in. glass slides.

The frame is  $76 \times 26$  mm.  $(3 \times 1 \text{ in.})$ , with an opening of 33  $\times$  24 mm. A glass slide, 76  $\times$  26 mm. is attached to the under surface of the frame by means of four plated screws. There are two springs in the opening for holding a large cover-glass, 32 × 24 mm., firmly to the glass slide, and also a small spring on the frame for securing a provisional label.

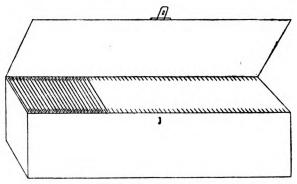


To prepare the frame for use, a  $32 \times 24$  mm. cover, which can be purchased from Zeiss or elsewhere, is laid on the glass slide beneath the two springs; the

specimen, on a smaller cover, is placed on the centre of the larger one, and is now ready for examination. For specimens which are to be stained the blood can be spread on either cover, but for wet ones, requiring immediate examination, the smaller cover should

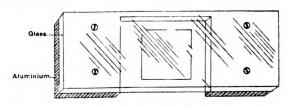
receive the drop of blood.

The glass slide beneath the frame is made of the best white plate glass and will, with ordinary care, need but an occasional renewal. Messrs. Zeiss supply extra glass slides with each frame. The two sizes of covers, 32 × 24 mm. and 18 × 18 mm., with the frame, are the only apparatus required for all ordinary clinical work, the frame rendering the carrying of slides quite unnecessary.

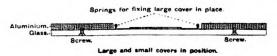


Box for carrying covers.

It is believed that this frame will be a help to many, especially to those who are obliged, either from choice or duty, to travel shorter or longer distances, and with whom every ounce is a consideration, not to mention the deterioration of glass slides. To such, a packet of covers will be all that is required, the staining and examination by means of frame being postponed until their return.



Lower surface—showing (1) glass slide with aluminium frame attached, (2) opening through the glass, and (3) four plated screws, by which frame is fastened to screw.



Section through "opening."

Another advantage is that the storing or preservation of specimens requires but an infinitesimal amount of space compared with the ordinary 3 × 1 in. slides; and the great difference of weight is also in favour of covers and frame. One hundred specimens, when covers are used, can be packed away in a box  $\times$   $1\frac{1}{2}$   $\times$   $1\frac{1}{4}$  ins. large.

This box, made of aluminium, is remarkably light. The sketch shows projecting teeth, between which the specimens are placed end-ways. But any box, one half the size, will be found large enough for carrying the same number of specimens safely, if separated from each other by means of their drying paper. On the larger of the two covers sufficient space will be found for a permanent label.

The frame and box being made of metal no danger of warping or breakage need be feared, two strong recommendations to those working in the tropics.

As the frame bears the name of Zeiss, it may be scarcely necessary for me to add it is both beautifully and perfectly finished.

I should mention that the dimensions of the "opening" can be made to fit any cover-glass, provided the size required be given at time of ordering.

# AMPUTATION FOR PERFORATING ULCER OF FOOT IN LEPERS.

By EDWARD HORDER, F.R.C.S.Edin.

Physician Superintendent, Leper Asylum (140 beds) and General Mission Hospital, Church Missionary Society, Pakhoi, China.

About two years ago I wrote Dr. Manson that, arguing from tuberculosis, in which disease every attempt is made to remove sources of sepsis, amputation for perforating ulcers of the feet of lepers should give good results, and therefore be performed, in order to remove once for all the source of auto-infection, eradicate as far as possible the cause of the exacerbations of leprosy, and give these patients another chance of obtaining fairly good health.

chance of obtaining fairly good health.

Dr. Manson replied that he thought judicious amputation under such circumstances to be good surgery, and kindly mentioned in his second edition of "Tropical Diseases" that I "strongly recommended amputation for perforating and other forms of ulceration; the general health is much improved by the removal of such sources of sepsis" (see article on Leprosy, page 453).

More than two years have passed since the first operation was performed, and knowing it has been stated that amputation of an ulcerated foot of a leper is useless, because the stump is sure to break down, I now send, to show this is not always the case, particulars of nine consecutive cases, which were operated upon by my colleague, Dr. L. G. Hill. Less than amputation is of no avail; removal of necrosed bones and tendons has not given permanent relief in our hands.

Case 1.—Female leper, Chan I., aged 18. Foot had been in an ulcerated condition for four years. Patient had suffered much from outbreaks of fever all the time, and never felt well. The right foot was removed by Syme's operation on October 23rd, 1899. Patient made a good recovery and is much stronger. There has been no ulceration since operation.

Case 2.—Female leper, Ne I., aged 16. Foot with perforating ulcer for four years, and constantly suffering from ill-health and fever. The left foot was removed on October 23rd, 1899, by Lisfranc's operation, and for eighteen months the stump was in an excellent condition. During the last nine months there has been slight ulcerations, but no fever since the operation. Patient feels much stronger.

Case 3.—Male leper, Yeung Tsat, aged 25. Foot ulcerated for many years, and patient suffering from constant outbreaks of leprosy and fever. A Lisfranc was performed on October 9th, 1899, and there has not been the slightest ulceration since, neither has the patient suffered from any exacerbations of leprosy.

Case 4.—Male leper, Lan Lok, aged 39. Very

Case 4.—Male leper, Lan Lok, aged 39. Very badly ulcerated foot, patient refused amputation for a long time. A Lisfranc was performed on August 2nd, 1899, but within a few months the stump broke down, and remained in this condition all the time the patient resided in the Asylum. Amputation of the leg would have given better results.

Case 5.—Male leper, Che Sam, aged 26. Perforating ulcer was present in the right foot and he suffered much in general health. A Syme was performed on August 5th, 1899, and the patient has remained in excellent health. No ulceration since operation.

August 5th, 1899, and the patient has remained in excellent health. No ulceration since operation.

Case 6.—Male, leper, Po Lo, aged 23. Suffered much from a perforating ulcer of foot, also fever and exacerbations of leprosy for about two years. Often on the sick list. Foot was removed by Lisfranc's operation on August 10th, 1899. Patient is much stronger, and foot has not ulcerated since operation.

Case 7.—Male leper, Ho Shan, aged 27. Badly ulcerated right foot for eight years, exacerbations and fever every few months, when foot and leg swelled. Patient never felt well. Foot removed by Farabeuf's subastragaloid amputation on October 4th, 1899. Patient has felt much stronger, and the stump has not ulcerated. During the last year he has taken salicylate of soda, and states "he never felt better."

Case 8.—Male leper, Sz Tái Fan, aged 28. Complained much of fever, weakness and general bad health. Left foot ulcerated for eleven years. This was amputated on October 9th, 1899, by Lisfrane's operation, but has not been a great success. There was no ulceration for a year, but since then small areas have broken down. These heal, but give way in a few months, to heal again. The patient, however, asserts he is much stronger than before the operation, and rarely suffers from fever.

Case 9.—Male leper, Lam Han Yeung, aged 25. Left foot with deep perforating ulcer for four years. Amputated on August 9th, 1899, by Lisfranc's operation. Patient states that before the operation he had exacerbations of leprosy about twice each year, when the foot swelled and became very painful. For one year after the operation there was no ulceration of the stump, but since then a portion was broken down. He is in a much better condition of health than before the removal of the foot.

The table below will show at a glance the improvement which has followed amputation in the abovementioned cases. A strong argument in favour of operation is the readiness now shown by the poor lepers to part with a portion, or whole, of an ulcerated foot. When operations were first talked about, the lepers were very reluctant to comply with our request, much persuasion often being necessary; but to-day they will ask for an amputation, knowing better health for a long period is insured for them by the removal of the ulcerated foot. In the above notes "fever" and "exacerbations of leprosy" signify the

effects seen in a patient after a fresh dose of toxin has been absorbed, either from an ulcerated foot or internal organs. At such times the leprous bacillus can usually be found in the blood. There is a fresh febrile attack consequent on a new liberation of bacilli and their toxins. The removal of the cause where possible prevents this auto-infection and saves the patient from these recurring outbreaks.

Patients in the leper asylum are prescribed chaulmoogra oil, gurjun oil, and cod liver oil, also arsenic and acids. A few cases have been taking salicylates with good results. Many drugs with an advertised "cure for leprosy" have been given from time to time, only to make us more thankful for the old remedies just mentioned. It is the concomitant diseases from which the lepers suffer that require so

much time and attention.

It is very noticeable how very limited is the life of many of the lepers after they leave the asylum, proving that good housing needed for ordinary complaints are factors to be reckoned with in the treatment of this dire disease.

Name	Sex	Date of Amputation	Operation	General Health	Return of Ulceration	Return of Exacerbation	No. of years foot ulcerated
Chan I	F.	1899. Oct. 23	Syme	Much im- proved	None	None	4
Ne I	F.	""	Lisfranc	", "	Not for eighteen months	,,	4
Yeung Tsat	M.	,, 9	,,	,, ,,	None	,,	Many
Lan Lok	М.	Aug. 2	,,	Not im- proved	Yes	Yes	"
Che Sam	M.	,, 5	Syme	Much im- proved	None	None	(?)
Po Lo Ho San	M.	,, 10	Lisfranc	" "	None	,,	2
Sz Tái	M.	Oct. 4	Fara- beuf	,, ,,	None	"	8
Fan Lam Han	М.	,, 9	Lisfranc	Improved	Not for a year	Rarely	11
Yeung	М.	Aug. 9	"	Improved	Not for a year, slightly atpresent	Rarely	4

#### BERI-BERI.

At the last meeting of the Epidemiological Society, Dr. Patrick Manson entered very fully into the question of the etiology of beri-beri, and although it is unfortunately true that this question still remains unsolved, yet there was much in what he said which was very suggestive, not only in relation to beri-beri itself, but also in regard to the causation of various other diseases. To those of us who practise in this country beri-beri may perhaps appear a matter of small interest, but the extraordinary gravity of the disease in regions where it prevails may be judged of from the statement made by Dr. Manson that in some plantations over 75 per cent. of the coolies have been killed off by beri-beri in a single year. Two theories are at present held as to the etiology of the disease, viz., the dietetic and the microbic. Among

those who have urged the dietetic theory, those have seemed to have most reason on their side who have attributed the disease to prolonged nitrogen starvation, owing to the long-continued use of a uniform rice diet. In proof of this theory some very striking cases have been collected in which after an improvement has been made in the diet the disease, previously very prevalent, has rapidly disappeared. On the other hand, this theory fails to explain all the facts, for numerous examples can be brought forward which show that the disease may prevail among populations whose diet has been specially devised so as to avoid the defects to which the origin of beri-beri has been attributed, and there are also many instances on record of Europeans enjoying a liberal diet falling victims to the disease. As to the germ theory, Dr. Manson, although saying that it is the more plausible of the two, adds that whether the germ produces its morbid effects while proliferating in the human body, or whether it acts indirectly by producing outside the body a toxin which, on being ingested or otherwise absorbed, acts on the nerves, it is impossible to say. On the whole, Dr. Manson inclines to the latter hypothesis, namely, that beri-beri is purely an intoxication, produced by a toxin elaborated by a germ whose nidus is located outside the human body, and "that in this respect beri-beri is on all fours with alcoholism, the germ of which is the yeast plant, the nidus solutions of sugar, the toxin alcohol, and, to complete the parallel, the pathological effect, a peripheral neuritis." That the disease is due to a living germ is proved by the facts that (a) the cause can be transported from place to place, and therefore cannot be of a climatic or meteorological nature; and (b) that when so transported it can multiply and spread, and therefore cannot be of an inorganic nature. The great question is where does the germ live and grow and produce the toxin by which the disease is caused? In answer to this it can at least be shown that certain ships become infected with beri-beri, and if ships why not houses and localities? There is a marked tendency among those who have studied this subject to regard rice as at least the favourite nidus of the disease, but, at any rate, whatever the exact medium in which the poison is distilled, the malady may be regarded as a "place disease," and it is much to be hoped that the expedition which has gone out to study its etiology will be able to isolate the organism by which it is caused and to discover the favourite media in which it grows, and by aid of which it becomes endemic in certain localities. We need hardly point out what an important subject is opened up for inquiry by the suggestive remarks of Dr. Manson. Who is to say what maladies and what conditions of deteriorated health may not arise from the absorption by the human body of the toxins produced by micro-organisms which have their locale in the food, the drink, the raiment, and the houses of mankind? We already know something of ptomaine poisoning, of alcoholism, of pellagra, of ergotism. Now we are told about beri-beri, but who shall say where is the end of the list of diseases which may be called zymotic in that they are due to "germs," but the germs of which are extra corporeal micro-organisms?—The Hospital, November 30th, 1901.

#### Business Motices.

- 1.—The address of the Journal of Tropical Medicine is Messrs. Bale, Sons & Danielsson, Ltd., 83-89, Great Titchfield Street, London, W.
- 2.—All literary communications should be addressed to the Editors.
- 3.—All business communications and payments should be sent to P. Falcke, Secretary to the JOURNAL OF TROPICAL MEDICINE. Cheques to be crossed London and South Western Bank, Great Portland Street Branch, London, W.
- 4.—The Subscription, which is **Eighteen Shillings** per annum may commence at any time, and is payable in advance.
- 5.—Change of address should be promptly notified.
  6.—Non-receipt of copies of the Journal should be notified to
- the Secretary.
  7.—The JOURNAL will be issued on the first and fifteenth day of every month. Any delay in transmission should be im-

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Contributors of Original Articles are entitled to six copies of the Journal. If reprints are required they will be supplied by the publishers, if the order is given with remittance when sending the MS. The price will be as below:—

50 Copies of four pages, 5/-;
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One page of the Journal equals 3 pp. of the reprint. If a printed cover is desired the extra cost will be for 50 Copies, 5/6; 100 Copies, 6/6; 200 Copies, 7/6.

#### THE

## Journal of Tropical Medicine

JANUARY 1, 1902.

#### THE FUTURE OF THE JOURNAL.

It is now twelve months since we ventured upon the publication of this Journal twice monthly. We did so at the suggestion of several contributors and subscribers, and we have no reason to regret the step. We have received many congratulatory letters on the subject, and, as the list of subscribers gradually extends, we believe the Journal is fulfilling, however imperfectly, the objects for which it was started. We are thankful for expressions of opinion: naturally we welcome those of a laudatory nature, but no less do we appreciate criticisms pointing out where we fail and where we might improve.

We urge upon our supporters to write to us direct when they find causes for complaint; they will be listened to in an appreciative spirit, for the Journal exists for the subscribers and not

for its editors and publishers. It is intended to be a direct vehicle of communication between medical men in distant lands; to be a means of voicing their wants and requirements; and to bring about a community of interest amongst the members of the medical profession who have to deal with diseases other than those met with, in the days of their professional education, in the medical schools of these islands.

We have been urged by some to form a "Tropical Medical Association," by others a "Colonial Medical Association," and to make the Journal of Tropical Medicine the official organ of such a society. We are willing to consider the formation of such a society seriously, if in the opinion of the supporters of the Journal it is thought desirable. It would not imply any extra subscription, but it would serve as a closer bond of union between medical men in countries far apart, but united by the fact that their surroundings and daily professional life are in spheres which have much in common.

Were such a society formed we would be enabled to have a "Journal Committee," to which the communications, &c., to the Journal would be submitted, and the opinion of the Committee would necessarily dominate the spirit and letter of the publications. It has even been suggested that the Journal might be formed into a public company, and that those interested in the subject of tropical medicine might become shareholders in the Journal, and directly control not only its literary but all its financial affairs. Whether this is likely to prove attractive, to the more commercially inclined, it is not for us to say, but an expression of opinion on the subject would have, no doubt, influence with the proprietor.

It is not usual for scientific journals to discuss matters of this kind in their columns, but the Editors feel that the Journal is a publication of so special a kind, appeals directly to so large a number of medical men who are specialists in tropical diseases, and is so important an element in the question of the hygiene of the Empire, that it ought to be established on the broadest possible basis.

#### THE ADMINISTRATION OF QUININE IN LAGOS.

H. E. SIR WM. MACGREGOR, G.C.M.G., LL.D., M.D., Governor of Lagos, sends the following communication regarding the administration of quinine in Lagos.

His Excellency remarks that the lists will show that the omission to take quinine runs in parallel lines with ignorance. The educated men who write grammatically take quinine, the others do not. Of the 174 who did not take quinine the answers of two groups of twenty officers, namely, the first twenty and last twenty, are taken as examples. That Sir Wm. Mac-Gregor's remarks are amply justified may be gathered from the perusal of the illiterate returns and the nature of the reasons assigned for not taking quinine.

RETURN OF OFFICERS WHO DO NOT TAKE QUININE AT ALL, AND REASONS ASSIGNED FOR NOT TAKING THIS

DRUG. No. Reasons.I have never taken Quinine; and in fact do not know what it is. No cause. 3 I scarcely have an attack of Fever and whenever I do, I use the Agunmu. Native Medicine is more preferable. Native Medicine is more preferable. As I use Native Remedies for fever. For I have no cause for it. Because I have not the cause of taking it. I am not accustomed to English Medicines. 10 I don't know how to take it. I have never taken it, as it has never been given 11 me by any medical Officer. 12 I got no Fever. 13 Because I have nobody to supply me. Simply because there is no one to supply me. None at hand presently. Native Medicine is more preferable. 17 Because am not supplied. 18 I see no necessity for taking quinine as a preventive since I seldom suffer from fever. Native Medicine is more preferable. Because I have not been accustomed to do so. 20

155 Because I was not trained up with it.

156 I never accustomed to such drug.

157Is not agreeable with me.

158 Because it is not used to.

159Because there is no occasion for it at present.

160 I use native medicine.

161 Because I use the Native medicine for fever.

162 My reason for not taken quinine is that I have never taken any before and sometimes when feverish I take Fruit Salt having no idea of the quinine as preventive.

163 Because I had not once suffered from Fever.

164 I never taken such medicine because I am accustomed with native medicine.

Because I have not come across it before.

166 No necessity needs this.

167 Because I never suffer from Fever.

168 Because I never use any before, I always use Native Medicine.

Because I do not know that it is a preventive. 169

I take no quinine because I have had no Fever 170 ever since I have been to this District, and I am not in supply to use it as a preventive.

Because I am accustomed to Native Medicine. 171

Because native treatment has been found agree-172 able with me.

Simply on account that I am accustomed to 173 Native Medicine.

Because I had it taken sometimes ago by the Doctor I felt something very bad in my head and for couple days after I hardly could hear when speaking.

RETURN OF OFFICERS WHO TAKE QUININE REGULARLY.

Seventy-six officers took quinine as a prophylactic and for the most part in the following doses :-

	Quantity	and ti	me.		N
rain					
	ACT 10 TO 10				
					4
	weekly				
		ice wee	kly		
	occeasion	ally fo	r 3	consec	utive
,,					
	for 2 cor	secutiv	e day	s repe	eated
,,	after 8	lavs			
	every oth	er dav			
	0,01,01				
	twice mor	nthly			
	monthly		4.245		
,,	monung		2.55	503	
					1
	rain	rains daily  """  """  """  """  """  """  """	rains daily  """  """  """  """  """  """  """	"" "" "" "" "" "" "" "" "" "" "" "" ""	rains daily

LEPERS IN ENGLAND.—In the recently issued report of the medical officer for the Port of London, Dr. Collingridge describes how he received information from the owners of the sailing ship Fingal that one of the crew of that vessel shipped at Calcutta, was found to be a leper, and that they had been forbidden by the United States Government to land the man at San Francisco. On the vessel's arrival at Gravesend "the patient was removed to the West London Hospital at the expense of the owners, this disease not being one dealt with under the Public Health It is not to be expected, however, that the owners will make themselves permanently chargeable with this patient, so here we have another "undesirable" dumped upon our shores. Whether or not, coming from Calcutta, he is a fellow subject, or merely a casual picked up at that cosmopolitan port of call, we do not know. The point is that while other countries refuse to receive these people we admit them without question.

8

## A MONOGRAPH

OF THE

## CULICIDAE

OR

## MOSQUITOES.

#### THE BRITISH MUSEUM

FROM VARIOUS PARTS OF THE WORLD

IN CONNECTION WITH

THE INVESTIGATION INTO THE CAUSE OF MALARIA CONDUCTED BY THE COLONIAL OFFICE AND THE ROYAL SOCIETY.

BY

#### FRED. V. THEOBALD, M.A., F.E.S.,

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AGRICULTURAL COLLEGE, ETC.

Author of "A Text-Book of Agricultural Zoology,"

"The Parasitic Diseases of Poultry," etc.

#### LONDON:

#### PRINTED BY ORDER OF THE TRUSTEES.

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Longmans & Co., 39, Paternoster Row, E.C.; B. Quaritch, 15, Piccadilly, W.; Dulau & Co., 37, Soho Square, W.; Kegan Paul, Trench, Trübner & Co., Charing Cross Road, W.C.;

AND AT THE

BRITISH MUSEUM (NATURAL HISTORY), CROMWELL ROAD, S.W.

1901.

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#### PRELIMINARY NOTICE.

THE notice on the adjacent column is not an advertisement, and we have departed from the usual stereotyped form of drawing attention to this work on account of its scientific and national importance.

The rôle played by mosquitoes in the spread of malaria, filaria, and probably yellow fever, &c., is so definite, so circumstantial, and so pregnant with possibilities in practical prophylaxis that too much attention cannot be bestowed upon the zoology of these insects. It is impossible to enter into detailed criticism of a work of such primary importance, seeing that the monograph has been but a few hours in our hands; yet a glance at the three handsome volumes justifies the conclusion that we have before us a scientific work which will rank as a classic.

Volume I. extends to 424 pages, and is illustrated by no less than 151 accurate drawings. Volume II. consists of 391 pages with 166 illustrations. Volume III. is devoted to plates, of which 148 are coloured. The work is produced in a style creditable alike to the author, the artists, the printers and publishers. The scientific accuracy of the drawings and colourings may be relied upon, for they have been produced with infinite care and with a scientific accuracy of which

it is impossible to speak too highly.

Mr. Fred. V. Theobald is so well known as an authority, perhaps the highest authority living, on the subject of the Culicidæ, that we accept his descriptions with the knowledge that we have before us a standard of reference in the work he has produced. The first paragraph of the preface contains a statement highly creditable to the Secretary of State for the Colonies, to whom practical science, especially in the field of tropical medicine, is already so deeply indebted. Professor E. Ray Lankester, the Director of the Natural History Department of the British Museum, who writes the preface, states, "The present 'Monograph of the Culicidæ or Mosquitoes,' had its origin in the appointment by the Royal Society, at the request of the Right Hon. Joseph Chamberlain, of a committee to co-operate with the officials of the Colonal Office in the investigation of the causes of malaria and the possibility of controlling that scourge of tropical lands.

Professor Lankester "sought the assistance of the Colonial Office, the Foreign Office, and the India Office in the attempt to procure properly preserved collections of mosquitoes from all parts of the world."

We are so accustomed in Britain to find all scientific investigation left to private and individual enterprise, that the present departure by those great departments is a welcome factor in our national life, and an indication that the physical welfare of peoples of the Empire, which has been so long officially neglected, is at last receiving the attention it deserves.

We give the addresses where this important work may be obtained advisedly, for we are of opinion that it is as important for practitioners in warm climates to have this monograph in their hands as to have

the most recent work on general medicine.

## Rews and Notes.

At the London School of Tropical Medicine, during the session just finished, twenty-eight students attended the course. Several applicants were refused owing to want of laboratory accommodation. The Seamen's Hospital Society and the School authorities are engaged in planning an extension of the School premises.

Mr. Alfred Jones, the originator of the Liverpool School of Tropical Medicine, has been created a Knight Commander of the Order of St. Michael and St. George. In connection with the School, and largely owing to the initiative of Sir Alfred Jones, a hall of residence for students has been arranged in Liverpool within easy residence of the Medical School and the Royal Southern Hospital. The cost of residence is wonderfully moderate, and it is hoped to attract students from the tropics, the hall being open to all races and creeds.

IRRIGATION IN INDIA.—It is a pathetic spectacle, that of Major-General G. C. Cotton, C.S.I., in the ninety-fourth year of his age vigorously carrying on the evangel of irrigation in India, which his brother, the famous Madras engineer, Sir Arthur Cotton, started so long ago as 1834. From his retirement the earnest nonagenarian follows with close interest the course of events in this country, and loses no opportunity of bringing the object which is nearest his heart prominently before the public. He has just issued, through the well-known publishing house of Rivingtons, a remarkable pamphlet containing a letter and two other papers on the waters of the great rivers of India as essential to the nation and the only possible means of preventing famine. The pamphlet well deserves the serious study of all interested in the important subject of irrigation in India. - Indian Engineering, September 21st, 1901.

CHILDREN KILLED BY ANTITOXIN.—A great sensation has been caused in St. Louis, U.S.A., by the announcement that eleven children have just died as the result of antitoxin administered to them as part of treatment for diphtheria. The eleventh child died on October 31st, and there were twenty-five other sufferers. The cause of death in each of the eleven cases was tetanus, and the physicians in attendance are unanimously of opinion that it was brought about by the antitoxin.—Brit. and Col. Druggist, November 8th, 1901.

Sanitation of Cuba.—A Cuban physician, Dr. A. Bustillo Lirola, writes in the Annals of Gynæcology and Pediatry on this subject. He compares the conditions prevailing in the island under Spanish rule and under American, needless to say, greatly in favour of the latter. He says: "We can proudly say that Cuba is hygienised. This could be possible, because the true Cuban population have aided greatly in it. Yellow fever has diminished in such a notable way that this fact alone is noteworthy. During last June

there has not been a death from yellow fever, nor even a case of the disease. Records show that since 1781, no previous June has passed with absolute freedom from the disease. Infectious diseases, as a rule, are less frequent. With the war on mosquitoes, malarial fever has also diminished. Leaving out of consideration the death-rate from 1895-1898, if the number of deaths during the year 1900 is compared with that of the years previous to 1895, we shall find that they are much less now. This is valuable testimony to the efficient efforts made under American occupation to render Cuba healthy, the more so, coming, as it does, from an impartial source."

A Women's Hospital at Manila has been opened recently, and is ready for the reception of patients. Miss Mary MacDonald, a graduate of Bellevue Hospital, who had a wide experience in military hospitals during the Spanish-American war, and has since seen conspicuous service in Manila, is the superintendent.

The founding of the hospital, which was a muchneeded institution, was largely due to the generosity of Mrs. Whitelaw Reid, who expressed her willingness to give 5,000 dollars toward the founding of such an institution. A board of trustees was immediately named, consisting of prominent Manila officials and business men, and the work was put into immediate operation.

The present service is limited to fifteen beds, but on occasion increased accommodations could readily be obtained. The furnishing of the rooms and all the accessories are of the latest and most approved pattern. The operating room, which is thoroughly modern, was equipped through the generosity of Colonel Greenleaf, Surgeon-General to the American army in the Philippines.

THE Siamese popular system of medicine is very much like the Chinese in many ways. Here is a recipe for a cold: "One portion of rhinoceros horn, one of elephant's tusk, one of tiger's, and the same of crocodile's teeth, one of bear's tooth, one portion composed of three-parts bones of vulture, raven and goose, one portion of bison, and another of stag's horn, and one portion of sandal. These ingredients to be mixed together on a stone with pure water. One-half of the mixture to be swallowed, the rest to be rubbed into the body."

THE LATE SURGEON-GENERAL HARVEY. GOVERNMENT RESOLUTION.—The following appears in the Gazette of India: "The Governor-General in Council has received with much regret the intelligence of the death at Simla on the 1st instant of Surgeon-General Harvey, Director-General, Indian Medical Service.

"Surgeon-General Harvey had only just returned from furlough to resume the duties of the Director-Generalship, a post to which he was first appointed in February, 1898, after honourable service extending over more than thirty years. By his death towards the close of a long and distinguished career the Government lost a valued public servant and trusted adviser."

Dr. Thorburn Manson leaves for Christmas Islands on Friday, January 3rd, to take up his duties as one of the members of the Commission recently despatched thither to investigate and report upon beri-beri.

#### PLAGUE.

#### PREVALENCE OF THE DISEASE.

At the present moment, January 1st, 1902, plague exists as a scourge only in India and in Mauritius.

India.—During the weeks ending November 30th and December 7th the number of plague deaths throughout all India numbered 7,961 and 8,878 respectively.

In the Bombay Presidency plague is widely distributed, 5,655 and 5,989 fatal cases (out of the total for all India) having occurred in this Presidency alone during the last week of November and the first week of December.

MAURITIUS.—For the week ending December 26th 38 cases of plague and 23 deaths from the disease occurred in Mauritius.

EGYPT.—Since November 29th no death from plague has been reported in Egypt. Only one case of plague was reported during the week ending December 15th in Egypt.

CAPE OF GOOD HOPE.—During the second week of December, 2 cases of plague only were reported from Cape Colony; one patient resided at Mossel Bay, the other at Ladismith. During the third week of December two natives developed plague at Port Elizabeth, but there were no cases elsewhere; no death from plague occurred during the week.

#### Current Miterature.

#### DIARRHŒA AND DYSENTERY.

The Action of Tannigen in Dysenteriform Enteritis.—Schweiger, who has had a considerable experience in Bosnia of the treatment of enteritis, complicated in the majority of cases by hæmorrhage (this form is known as "Bosnian disease"), bears testimony to the favourable action of tannigen. In twenty cases of hæmorrhagic entero-colitis tannigen was administered; usually opiates are given, with the serious drawback that meteorism is often produced. If, on the contrary, tannigen is prescribed (7½ grains three times a day), this symptom is not met with. All the cases treated with tannigen were easily cured without recourse to any other drug.

In chronic dysentery the results are less brilliant, but large doses (15 grains three times a day) effect considerable improvement.—F. H. S., Die Heilkunde, July, 1901.

SULPHUR IN DYSENTERY.—The treatment of dysentery was summarised by Sir William Gull in three words—"rest, warmth, and ipecacuanha."

However, in many cases these measures prove disappointing. Remembering that sulphur is an efficient substitute for ipecac. in the local treatment of anthrax, Dr. G. E. Richmond decided to try the same substitute in dysentery. He prescribed 20 grains of sublimed sulphur with 5 grains of Dover's powder every four hours. The two cases in which the treatment was carried out both bear testimony to the value of sulphur in this affection. It is no specific, but a welcome addition to our remedies. As soon as the diarrhea diminishes, less frequent doses should be given, otherwise obstinate constipation will follow. The remedy seems to exert an antiseptic action.

Pain and tenesmus are relieved by sulphur more effectually than under other methods of treatment. Moreover, the cure obtained seems to be more lasting, the disease showing less tendency to become chronic or to relapse. Bloody and mucous stools rapidly give place to fæcal evacuations, and the odour of the fæces becomes less offensive, though the number of movements does not at once diminish.

The author has not met with a case of dysentery

which would not yield to the sulphur treatment.— Medical Record, October 19th, 1901.

Rhabdonema Intestinale and Intestinal Flux.—
The exact part played in the diarrhœas and dysenteries of hot climates by the *Rhabdonema intestinale*, or anguillula stercoralis, as its better-known rhabditiform phase is called, has always been a matter of uncertainty since the nematode was discovered by Normand in 1876. It is generally believed to be harmless; Manson thinks it doubtful if it can even

produce a slight degree of intestinal catarrh, and Brault, "Maladies des Pays Chauds," p. 107, sums up thus a discussion on the worm," it exists simply as a sort of epiphenomenon, the anguillula is introduced accidentally into the digestive system, because it finds in the condition of the intestinal secretions a milieu favourable to its existence and reproduction.' More recently, however, Dr. Strong, Director of the Army Pathological Laboratory at Manila, reports on a case of a patient, eight years a resident of Baltimore, U.S.A. (Johns Hopkins Bulletin, x., Nos. 1, 2, 1901), who suffered from chronic diarrhœa and liver abscesses; in the pus of the abscesses amœbæ were found, and a microscopic examination of the stools showed embryos of the anguillula and amœbæ. At the autopsy the "parasitic form" of the adult female Rhabdonema was found in the small intestine. Strong refers to four other cases of infection by this worm, causing intermittent diarrhœa and gastrointestinal disturbances. In the Baltimore case "the eggs, embryos and the worms" were found in the

GOUDOU OR ANAKHRE.—Drs. Mendes and Jeanselme describe this disease, which is prevalent amongst the negroes of the West African coast, as a "bony, spongy tumour, ovoid and symmetrical, growing at the root of the nose." The disease as a rule sets in before puberty, and by its encroachment on the eye

glands of Lieberkühn, where they produced atrophy

of the epithelium and round-celled infiltration .-

Philadelphia Medical Journal, August 31st, 1901.

and nose it interferes with the sight and hampers breathing. The general health remains comparatively unimpaired, but headache, a muco-purulent discharge from the nose, and epistaxis herald the appearance of the ailment, Mendes observed a case in Brazil; this had the peculiarity of being unilateral. Extirpation of the growth is the only effective remedy of the disease.—Revue de Chirurgie, October, 1901.

#### FORMULÆ.

THE ADMINISTRATION OF QUININE TO CHILDREN.—
The following prescriptions are cited by the Revue
médicale for October 9th from an analytical article
by Dr. Lemanski in the Bulletin de l'hôpital du Tunis.

Petzold gives quinine in honey dissolved in acidu-

lated water:

R Quinine sulphate . . . 10 grs.
Acidulated water . . . 75 mins.
White honey . . . 600 grs.
M.—A coffeespoonful every two or three hours.

Crépuy's prescription :-

R Distilled water . . . . 600 mins, Extract of liquorice . . . 45 grs. Quinine hydrochloride . . . 4½ grs.

A child usually makes no difficulty in swallowing the whole of this at one time.

A recent number of the Klinische therapeutische Wochenschrift gave the following:—

Ten drops of this mixture are given in an ounce and a half of water, to which are added forty-five grains of sodium bicarbonate. The mixture is drunk while effervescing.

Saccharine may also be used advantageously to

mask the taste of quinine.

Dr. Lemanski, himself, prefers the rectal method of administration. The suppository is better tolerated than the enema and causes no smarting or defectation.

R Quinine salt . . . . . from  $1\frac{1}{2}$  to  $7\frac{1}{2}$  grs. (according to age)

Cacao butter . . . . from 15 to 45 grs.

Virgin wax . . . . . q. s.

M. ft. suppositorium.

In some cases cacao butter may be replaced by glycerin solidified by the addition of gelatin. Two suppositories daily are to be inserted without regard to the thermometrical exacerbation, the object being to saturate the economy with the drug for a sufficiently long time to combat the paludism.—N.Y. Med. Journal, November 16, 1901.

FOR MALARIAL LIVER TROUBLE.—M. Lemanski (Nouveaux Remèdes, October 8th) gives the following:—

R Sodium cacodylata ...  $\frac{15}{100}$ ths of a gr. Powdered cinchona ... of each  $7\frac{1}{2}$  grs.

For one wafer. Three wafers to be taken daily.

Frequent purgation, by means of the following formula, is also often effective:—

Divide among three wafers, to be taken fasting in the morning, at intervals of a quarter of an hour, once a week.

TREATMENT OF DYSENTERY.—Hughes recommends the following in the treatment of dysentery:—

#### LEPROSY.

Dr. Hallopeau in an article in Lepra, June, 1901, advocates the use of chaulmoogra oil subcutaneously in cases of leprosy in which it causes digestive disorders when taken orally. In confirmation of these views he quotes a case of Tourtoulis-Bey of Cairo:—

"In this case the subcutaneous injections were made at first very frequently, about twenty times a month, 5 gm. at a time, and were continued at intervals for about five years. The injections were made on the extensor surfaces of the extremities, were not painful, and the swelling that they caused disappeared in twenty-four hours. The improvement began at once, until finally the patient could be regarded as cured, having only a few slight signs of the trouble left."

Hallopeau has come to the conclusion that:—

(1) Lepers treated with chaulmoogra oil, either hypodermically or by the mouth, may show such an improvement that they may be fairly regarded as cured.

(2) More often they continue to show signs of the affection, but these are usually of a benign character.

(3) In certain cases intense local and general exacerbations appear in spite of the treatment.

(4) It is probable that this drug has a favourable

influence upon leprosy.

(5) This influence is not usually sufficient to cure the disease; it cannot in any way be compared to that of mercury or the iodide of potash in syphilis, nor to that of quinine in malaria.

(6) It is best given in hypodermic injections to patients who bear it well; it may give rise to febrile

disturbances and to pulmonary emboli.

#### MALARIA AND MOSQUITOES.

FORMALDEHYDE GAS FOR DESTROYING MOSQUITOES.
—Dr. M. J. Rosenau declares, in a recent issue of *Public Health Reports*, that experiments undertaken by him have shown that formaldehyde gas is an efficient

insecticide so far as the mosquito is concerned. The experiments were all made upon the *Culex pungens*, and it was found that an exposure of three hours was invariably sufficient to kill all the mosquitoes of this variety in a confined space, provided the gas was used in amounts usually employed for disinfection.

Mosquitoes Attracted by Sound.—Major Ronald Ross writes to the *British Medical Journal* that he has recently received a communication from Mr. Brennan, of the Public Works Department, Jamaica, containing the following observation: "You will pardon me for drawing your attention to the fact, if you have not already noticed it, that the mosquitoes (I do not know if every variety) will respond to such sounds as a continuous whoop or hum. I have tried the experience lately, and find swarms gather round my head when I make a continuous whoop. There may be, however, some particular note or pitch that would be more attractive to them." This would afford an interesting subject for investigation, the journal quoted remarks, on the lines of Dr. Nuttall's recent research on the colours attractive to mosquitoes.

MALARIAL HÆMOGLOBINURIA. — Otto Lerch says that in the treatment of this condition, it must be borne in mind that quinine has no curative influence; it destroys the plasmodia, but if enough has been taken to accomplish this object, we aggravate the case by adding one more toxic substance to those already present. Absolute rest is of paramount importance. Fresh air is the next indication. The primary lesion is an intense anæmia; the red blood-corpuscles are enormously decreased in number, their chemical composition is changed, and they are especially deficient in hæmoglobin, so that the physician should see to it that every corpuscle that is able to carry oxygen should have a chance to grasp it. Pure air is the best thing, but inhalations of oxygen may also be tried. The emunctories must be cleared, the anæmia is to be treated with iron and arsenic, and the diet must be carefully regulated .- New Orleans Medical and Surgical Journal, November, 1901.

PSYCHICAL DISTURBANCES IN PALUDISM .- M. Jean P. Cardamatis says that one must distinguish between the psychical disturbances which occur in the height of a simple intermittent fever, those which arise during the fever and in the intermittent stages of chronic paludism, those observed in the course of a remittent fever, and the psychoses which appear in the course of malarial cachexia. These manifestations are undoubtedly due to the toxines developed during the disease, and usually in persons of a neuropathic taint. Paludism can arouse morbid predispositions to the psychoses, neurasthenia, and hysteria, and also any local or general disease which is latent. The delirium in malaria does not differ in any respect from that evoked by other acute infectious diseases or endogenous or exogenous intoxications. Acute mania may also appear, as well as melancholia.—Progrès médical, September 28th, 1901.

ACUTE PULMONARY COMPLICATIONS IN MALARIA.—Crespin and Mailfert have investigated some of the lesions present in the lungs in cases of malaria, more especially the broncho-pneumonic (Arch. Gén. de

Méd.) They find that acute bronchitis is frequent in many cases of malaria, and that the bronchial lesion is most marked in the bases, especially on the left The bronchial complication seems to be in proportion to the amount of lesion present in the spleen and liver. Pulmonary congestion is also common, but varies very much in its intensity in different cases. Pneumonia is also present in several cases, and the prognosis is extremely uncertain, death taking place in a large number. Pneumonia may come on after the malarial attack, and supervening in cases of malaria of long standing is very serious. The temperature in malarial pneumonia is deceptive, and in many cases of post malaria there may not be a very high degree of pyrexia. In fact the writers describe an apyrexic pneumonia of a very serious type. Pneumonia is due to the pneumococcus, not to the hæmatozoa. There is therefore nothing specific in this form of pneumonia. The relation of this latter to the pneumonic process is not quite easy to understand. It is suggested by the writers that its tendency to cause congestion creates a predisposition to a pneumococcal infection. The writers also draw pneumococcal infection. attention to the fact, which has been several times noted, that in malaria there may be an apical consolidation simulating phthisis in many of its characteristics. A curious point about the apical consolidation met with in malarial cases is its tendency to pass to the opposite apex with extreme rapidity. twenty-four hours the upper portion of one lung may have completely consolidated. The treatment of all these complications is the free exhibition of quinine. This does not, however, mean, according to the authors, that the pulmonary condition is a specific The action of quinine is widespread and seems to reduce congestion in the organs generally, and therefore favours the resolution of the pneumonic process.—(Brit. Med. Jour.).—Ind. Med. Record, Nov. 13th, 1901.

BENEFIT OF INTRASPLENIC INJECTIONS IN CHRONIC MALARIA. By J. L. Castro Gutierrez.—The writer relates several cases of chronic malaria with hypertrophied spleen, absolutely rebellious to quinine or any medicinal treatment. He injected directly into the spleen a Pravaz syringeful of a mixture of 20 cg. of malate of iron and six drops Fowler's solution, in water. The evening of the same day an acute malarial attack occurred, with fever at 40 C. Subcutaneous injections of quinine were made repeatedly. The third day the intrasplenic injection was repeated, but was not followed by any reaction, and the patient's further recovery was rapid. The experience was repeated in every case. The malaria parasites had probably ensconced themselves in the spleen, and quinine did not reach them. The intrasplenic injection roused them up and forced them into the general circulation where the quinine administered immediately afterward soon destroyed them. The author asserts, therefore, that the technique should be first the intrasplenic injection, and then large subcutaneous doses of quinine, as soon as the acute attack appears.-[Chronica Medical (Lima.)]

Subcutaneous Injections of Quinine in Malabial Fever.—The great objection formerly alleged against

the hypodermic injection of quinine was the great liability of causing an abscess at the seat of injection; at the present day such an abscess would infallibly be attributed to the use of a dirty needle, and would be looked upon by most physicians as a very unfortunate accident. Dr. Ant. Guiseppe Cipriani, in La Medicine Scientifique, however, maintains that such abscesses are beneficial, and he causes them intentionally, it appears, by injecting into the deeper layers of the dermis, instead of into the subcutaneous tissue. His observations, which he says have been verified by others, go to show that by this method the fever is cut short much more quickly than when quinine is given by the mouth or subcutaneously, that the general health is more quickly restored, and that the patients, though living under malarious conditions, keep free from fever a longer time than their neighbours. He has chiefly treated children in this way; the drug he uses is the bichloride of quinine.—Indian Medical Record, October 16th, 1901.

A Case of Malarial Nephritis, with Massing OF PARASITES IN THE KIDNEY .- James Ewing states that microscopical examination of the kidneys of fatal cases of malaria has yielded evidence of three main types of acute renal lesions occurring in this disease: (1) Acute degeneration of toxic origin, often reaching a degree in which exudation of blood serum into the tubules is added. This lesion is responsible for the vast majority of the cases of albuminuria in malaria. (2) An extreme form of acute degeneration, with focal necroses, numerous hæmorrhages, and exudation into the tubules of blood serum and blood pigments. This lesion is seen in cases of hæmoglobinuric malarial fever, and it has not yet been found associated with an excessive number of parasites in the capillary vessels. (3) Massing of parasites in the renal capillaries, with extreme degeneration of parenchyma cells, multiple hæmorrhages, and exudation of blood serum into the tubules. It seems certain that this type of lesion can occur only in severe æstivo-autumnal infections. There is anatomical evidence that in the pernicious æstivo-autumnal cases the three types of lesions may be variously combined, but no good reason for believing that with the benign tertian infection occurring in this latitude any other than the first type can exist.—American Journal of the Medical Sciences, October, 1901.

Quinine and its Esters.—Dr. M. Overlach says that saloquinine, the ester of quinine, has these advantages over the ordinary preparation of the drug: (1) It is absolutely tasteless; (2) its use is followed by no ringing in the ears or disturbance of hearing, by headache, vertigo, or other symptom on the side of the nervous system; (3) no irritation of the gastro-intestinal or genito-urinary tract has been noticed, even after the employment of large doses. It is given in doses of 30 grs., once or oftener daily, to adults. A neutral salt of the ester is equally useful in annulling pain. It is given in increasing doses, from 15 grs. up to 60 grs., omitting the drug for a day when the maximum dose is reached. The author has found it useful in all kinds of rheumatic affections, neuralgia, neuritis, the lancinating pains of tabes, and gonor-

rhœal rheumatism.—Centralblatt für innere Medicine, August 17th, 1901.

EUQUININE IN MALARIA.—The value of the euquinine as a prophylactic in malarial fever, and in guarding against relapse of the fever, is admitted. The Italian observers Celli, Di Mattei, and Mori regard it as of marked prophylactic power. In the intermittent fevers in this country it is of value combined with arsenic and iron.

The following is a practical formula:-

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R Euquinine . . . . . grs. ii.—iv. Acid arseniosi . . . . grs. \frac{1}{100} \frac{1}{60} Ferri sulph. exsic. . . . grs. \frac{1}{2}—i. M.—Ft. caps. No. 1. S.—Use thrice daily.
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-Clinical Review, September, 1901.

TREATMENT OF MOSQUITO BITES.—Dr. A. Manquat states that the most successful treatment consists in the local use of formalin, tincture of iodine and alcohol. He uses the pure formalin or alcohol in one-half strength. The tincture of iodine is objectionable because of the stain it leaves on the skin. As a prophylactic against mosquito bites the following combination is of service:—

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      Oil of tar
      6 drms.

      Olive oil
      6 drms.

      Oil of pennyroyal
      ½ oz.

      Spirit of camphor
      3 drms.

      Glycerine
      2½ drms.

      Carbolic acid
      1 drm.

      M.—Apply on retiring.
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-Jour. Am. Med. Association.

#### PLAGUE.

INOCULATION AT POONA.—From July 1st to December 2nd 719 cases of plague occurred at Poona, of which number 541 died. Fifty-nine inoculated persons had been attacked by plague, of whom only six died. These numbers bring the benefits of inoculation very prominently to the fore.

HAFFKINE'S SERUM.—The statistics of the plague in Bombay seem to have established the fact that Haffkine's plague prophylactic is an effective serum for immunising patients who have been exposed to the disease. Out of 3,814 inoculated persons in the Khoja Mussulman community but three deaths occurred, while among 9,516 uninoculated persons fifty-nine deaths occurred.—Medical Record, November 2nd, 1901.

The belief that plague infection in Europe is nearly entirely carried by rats should call for the extermination of these rodents both in ships and at all seaports, if nowhere else. Fighting with rats is not like fighting with anything so minute as the mosquito, and if this latter is not regarded as an impossibility, certainly rats should have but a small chance of existence. There are places where the presence of rats is regarded as a matter of course, though they may not be exactly popular. Now they are shown to be a danger to the community, and their extermination must be regarded as an absolute duty. With their disappearance it may transpire that some other scavengers may have to be employed, for even rats have their use.—The Hospital, November 30th, 1901.

THE PLAGUE.—It is officially reported that the plague is at an end in Naples. There were but 15 cases in all, and the time from the discovery of the first case to the discharge of the last from the hospital was but three weeks. In Egypt there were 160 cases during a period of six months, only one of these being in the person of a European. In Rio de Janeiro and Campos, Brazil, the epidemic continues, two or three new cases being reported daily. The representative of the United States Marine Hospital Service at Constantinople has made a report on the plague in that city, which he says has been prevalent since last April. He reports that 20 cases have occurred, although the local authorities, following the example of the Sultan, have shown much willingness in taking necessary preventive steps. The disease has been of a mild type as compared with the epidemic in China and India.—Medical Record, November 2nd, 1901.

RAT PLAGUE.—Edington (Centralb. f. Bakt., June 27th, 1901), who has been making investigations at Cape Town, has isolated from a rat, supposed to have died of plague, a bacillus resembling the plague bacillus in cultures and in its effects on guinea-pigs, but differing from it morphologically and in having no effect on rabbits. He concludes as a result of these experiments, that the so-called rat plague is not the same disease as bubonic plague, and suggests that in future in cases where rats die trom a disease resembling plague, other animals besides guinea-pigs should be used for diagnostic experiment. The disease produced by the organism isolated by the writer resembles in guinea pigs that produced by the true plague bacillus.

DETECTION OF PLAGUE BACILLUS.—The plague bacillus can be detected during life if an infected gland is pierced with a hypodermic needle, and some of its contents used to make cover-glass preparations in cultures. Novy (American Journal of the Medical Sciences, October, 1901) failed in one attempt of this kind because his needle did not actually pierce the small gland in which the plague bacilli were active.

#### YELLOW FEYER.

A SYSTEMATIC study of yellow fever is about to be undertaken by the Marine Hospital Service, the incentive thereto being the discoveries made by the army medical officers in Cuba, and the demands, based upon these discoveries, made in the interests of commerce for a relaxation of the existing quarantine regulations. For the better carrying out of the desired investigations, an institute will be established for the purpose of collecting all facts concerning yellow fever, to designate the specific lines of enquiries to be made, and to make the same. The work will be divided among four sections, on history and statistics, etiology, transmission, and quarantine and treatment, respectively. The following are the topics to be considered by each of the sections:—

sidered by each of the sections:—

A. History and Statistics: (1) The early history of the disease. (2) Relation to the slave trade. (3) History of recent epidemics (since 1850). (4) Relation to modern sanitation, especially paving, drainage, &c., in cities. (5) Why did not New Orleans have it in early times while Boston did? (6) Mortality statistics.

(7) Maps showing yellow fever zones. (8) Maps showing the infectible territory in the United States.

B. Etiology: (1) The cause of the disease.

C. Transmission: (1) The transmission of the disease by the mosquito. (2) Can any other mosquito than the stegomyia fasciata carry the infection? (3) Is the progeny of the mosquito also infected? (4) How many generations? (5) Can the mosquito become infected by any other means than by sucking the blood of a patient sick with the disease? the mosquito become infected by contact with the dried-blood discharges or other infected materials upon fomites? (7) Can the disease be transmitted by any other means than through the mosquito? (8) Can the disease be conveyed by fomites, or through the air, soil, or water? (9) The geographical distribution of stegomyia fasciata in relation to the disease. (10) Is the immunity enjoyed by certain localities due to the absence of this variety of mosquito? (11) A study of the life and habits of the stegomyia and allied species, especially with a view to their extermination.

D. Quarantine and Treatment: (1) Is disinfection of baggage necessary to prevent the spread of the disease? (2) Is any treatment of baggage necessary? (3) Mosquitos in baggage, in merchandise, in cars, in ships. (4) Treatment of the patient. (5) Guards against mosquito bites. (6) Immunity of individuals, of races. (7) Individual prophylaxis. (8) Communal

prophylaxis-sanitation.

The Efficacy of Quarantine and Fumigation in the Prevention of the Spread of Yellow Fever, without Molesting the Mosquito.— Joseph Waldauer advocates quarantine that will permit commercial intercourse with as little interruption as possible, commensurate with safety. He cites a number of instances, one of which is as follows: In 1897 yellow fever had infected the eastern part of Clinton, Miss. A cordon was placed about the infected centre, and not a single case appeared outside of this boundary. The mosquito was there, but seven-eighths of the population escaped the disease. He reports instances in which he believes fomites are alone responsible for the existence of the disease.—American Medicine, October 5th, 1901.

THE PREVENTION OF YELLOW FEVER (by Dr. Walter Reed and Dr. James Carroll).—Referring to the disinfection of cargoes, the authors point out that the only possible excuse for subjecting a cargo to disinfection would be the fear of the presence of infected mosquitoes in the vessel's hold. If the voyage has consumed more than five days, however, all of the mosquitoes contained in the hold will have died. With our present knowledge of the propagation of yellow fever, personal baggage should no longer be subjected to disinfection, and with our increased ability to prevent its spread by measures easy of application, instances should be few and exceptional when a vessel coming from a yellow fever port should be delayed longer than is necessary to remove her non-immune passengers who have not yet completed their period of five days since leaving the port of departure. A most important work will have been performed if we can persuade the sanitary authorities

of Mexico and of the Central and South American States to join us in the adoption of more enlightened methods for the suppression of this widely prevalent epidemic.—Medical Record, October 26th, 1901.

ON THE MODE OF TRANSMISSION OF THE INFECTIOUS AGENT IN YELLOW FEVER AND ITS BEARING UPON QUARANTINE REGULATIONS (by Dr. A. H. Doty). - The author does not believe that Dr. Reed's experiments have shown conclusively that there may not be some other means than the mosquito by which yellow fever is transmitted. Considering these experiments, however, in connection with the results of our practical experience, it is clearly evident that this disease is not contracted by personal contagion or through the medium of clothing, bedding, cargoes of vessels, &c. He believes that we are justified in changing our quarantine regulations to conform to these views, and that such a proceeding is safe and reasonable. future shows that there are other means of infection, it will be then time enough to add whatever restrictions are necessary for the protection of the public health.—Med. Record, October 26th, 1901.

REGARDING YELLOW FEVER ON THE "ETHEL-BRYHTA."-This vessel reached New York on August 21st, one of the crew having died the previous evening. The appearance of the body, the history of the case, and the result of the autopsy justified the Health Officer in officially declaring it to be yellow fever, although the post-mortem evidence was not entirely conclusive. Three of the crew, whose temperatures were above normal, were removed to Swinburne Island for observation. These were afterward discharged well, having had no symptoms of the disease. The vessel was disinfected and proceeded to New York, and left there on August 25th, and went to Delaware Breakwater, Norfolk and Jacksonville, arriving at the last place on September 3rd. The vessel remained there (Jacksonville) for about two weeks and then sailed for Santiago, reaching that port on September 19th. On arrival it was found that three of the crew had been sick with fever, and one died; and very soon afterward eight or ten more were affected in the same way. These were at once declared by the authorities to be cases of yellow fever. It was this condition which was reported from Santiago, and which would convey the idea that the disease had been stringing along since the departure of the Ethelbryhta from Progreso. Those who have given this matter careful consideration are perfectly satisfied that yellow fever is not transmitted by personal contagion or through the medium of clothing, bedding, &c., and that secondary cases do not occur after five days' removal from the infected area. No one believes that the wife of the captain died of yellow fever, and her death has been satisfactorily accounted for. She was perfectly well when she left Norfolk, according to the statement of the Health Officer of that place. On the following day she was taken suddenly ill and died. The reason of this has been accounted for. Vessels which loaded at the same dock with the Ethelbryhta in Jacksonville were found to have a number of cases of fever on board at practically the same time that the report came from Santiago regarding the Ethelbryhta. The health officials of Jacksonville have examined these cases and have declared them to be malarial fever, clear and well defined, and the examination of the blood has shown the plasmodia. Comment is unnecessary. It is difficult for an experienced sanitarian to believe that the cases reported there are those of yellow fever, particularly as the latter disease does not exist in Jacksonville. — Med. Record, October 5th, 1901.

Partial Failure of Antivener.—Dr. Calmette, of the Pasteur Institute at Lille, was recently, as we noted at the time, bitten by a cobra during the course of some experiments he was making. He immediately injected subcutaneously a dose of antivenene which had been prepared by himself, and his life was preserved. He was not saved, however, from all the consequences of the injury, for it was found necessary three weeks later to amputate the bitten finger, on account of gangrene, which set in soon after the accident.

PRIZE FOR FILTER FOR STREET STANDPIPES.—A prize of 3,000 pesetas, or about £85, is offered by the Spanish Government for the best model of a filter adaptable to street standpipes, in order that the public may receive water in the most drinkable condition. The filter must be susceptible of being attached to the standpipes or taken off if required, and must be capable of filtering a quantity of water of not less than 800 litres per hour. A second prize of 1,000 pesetas, or about £28 9s. is offered for the second best model.—Indian Engineering, September 21st, 1901.

VACCINE LABORATORY FOR BURMA.—The Superintendent-General of Vaccination, Burma, says that
to ensure success in manufacturing lymph, a laboratory
must be constructed on sanitary principles on the
same lines as a modern hospital. Plans of such a
building are being drawn up by the P. W. D. and the
necessary plant has been ordered from England.
Meiktila is spoken of as a favourable station for the
construction of such a Vaccine Laboratory, which
promises to be of great use in the province. It is
close to the Shan States, where the Chiefs are
greatly in favour of vaccination, and has a cooler
climate than Rangoon.—Indian Engineering, October
19th, 1901.

LIVINGSTONE COLLEGE.—The Annual Public Meeting of Livingstone College, which has previously been held at the end of November, has been deferred until next summer, in order that it may be held in the beautiful grounds of Livingstone College. The Annual Report has, however, been presented to a General Meeting of Members of Livingstone College, incorporated 1900, and will be published shortly, together with other interesting matter, in the Livingstone College Calendar and Year Book. An advance copy of the Report and Financial Statement has been issued to subscribers and other friends of the College, from which the following particulars may be obtained. It will be remembered that the new premises of the College were opened in June last by Dr. Livingstone's elder daughter, Mrs. Bruce, accompanied by her

Australasian Medical Gazette. Boletin de Medicina Naval.

sister, Mrs. Wilson, and other members of the Livingstone family; work had, however, been carried on at Leyton since the previous October, so that the first complete session in this house has now been completed. The result is considered by those responsible for the administration to be an unqualified success. The premises have proved to be admirably suited for both the accommodation of the students and for the Principal's private residence, and the hopeful forecast which was made a year ago of the advantages which would be gained by the acquisition of Knott's Green House has been fully proved. During the last term 19 residents and 9 non-residents were going through the course of training, a larger number than had ever previously been together at the College at any one Unfortunately, this number has not been maintained in the new session, and consequently a special six months' course is being arranged, commencing from January, 1902, which it is hoped may suit some students who wish to avail themselves of the training of elementary Medicine and Surgery which is given at the College.

Turning to finance, the Report states that the General Fund, which includes all the work done in connection with Livingstone College (except those departments which are dealt with under the head of the Travellers' Health Bureau), shows a balance of £13 1s. 8d.; but it is pointed out that there still remains a debt of over £3,000 on the property, which will form a serious embarrassment to the work if it is not cleared off. Seeing that this property has been dedicated as a memorial to the late Dr. Livingstone, it is felt that this sum should be fully subscribed, and an appeal is made to all who are interested in the life and work of this great missionary and traveller, as well as those who are concerned with the welfare of Missionaries, to contribute the sum which is still required. With reference to the subject of the Travellers' Health Bureau, it is pointed out that there is a deficiency of £296 18s. 3d. Under this head the Report draws attention to the large amount of work that has been done in connection with the Bureau during the past two years. "Climate," its official organ, has been circulated in all parts of the world, and has made available for ordinary travellers the important results which are being achieved by the schools of tropical medicine, and in other ways has supplied to travellers and missionaries information concerning the various hygienic precautions which should be taken by those travelling or residing in tropical climates. In addition to this, two Exhibitions have been organised by the Bureau under the title of the Livingstone Exhibition, the last, in June, 1901, under the patronage of H.R.H. the Princess Christian, and under the presidency of the Right Hon. Sir George Taubman-Goldie, and having the support of the chief Government offices which are concerned with foreign parts.

#### EXCHANGES.

Annali di Medicina Navale.
Archiv für Schiffs u. Tropen Hygiene.
Archives de Medicine Navale.
Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie.

Boston Medical and Surgical Journal. Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology. British Medical Journal. Brooklyn Medical Journal. Caducée. Climate. Clinical Journal. Clinical Review. Giornale Medico del R. Esercito. Hong Kong Telegraph. Il Policlinico. Indian Engineering. Indian Medical Gazette. Indian Medical Record. Janus. Journal of Balneology and Climatology. Journal of Laryngology and Otology. Journal of the American Medical Association. La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal. Medical Brief. Medical Missionary Journal. Medical Record. Medical Review. Merck's Archives. New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyclinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo. Sei-i-Kwai Medical Journal. The Hospital. The Northumberland and Durham Medical Journal.

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- 1.—All communications will be acknowledged in the JOURNAL under the heading "Letters and Communications Received." Contributors who do not see their names in the list should communicate forthwith with the Editors or Secretary.
  - 2.—Manuscripts sent in cannot be returned.
- 3.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
- 4.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.
- 5.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Editors.
- 6.—Correspondents should look for replies under the heading "Answers to Correspondents."

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In order to meet the constant enquiry for addresses of respectable firms catering for the various requirements so difficult to obtain abroad, we give a list of names and addresses which we trust will be found useful to our numerous correspondents and subscribers.

#### Original Communications.

NOTES ON THE FIRST PLAGUE EPIDEMIC AT CHANGPOO, FOKIEN, SOUTH CHINA.

By J. PRESTON MAXWELL, M.B., B.S., F.R.C.S.

As will be readily seen on reference to the sketch-map provided, Changpoo is the principal city in a large area of country to the south-west of Amoy. Its inhabitants number about 20,000, and the foreign community is entirely missionary. Thus we have here to deal with the spread of disease amongst a pure native community, free from European innovations in the way of steamer or railroad communication.

As to the map provided, the coast-line is taken from the Admiralty charts, and the inland places are assigned their position partially by reference to a local missionary map and partly from the knowledge acquired by the writer in travelling over the region.

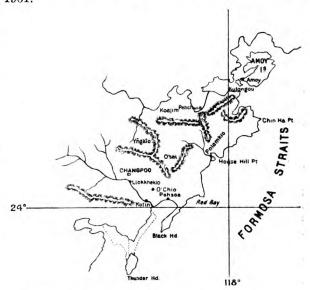
acquired by the writer in travelling over the region.

With these preliminary notes, let us pass to the consideration of the subject in hand. Let me remind my readers of the past history of the disease.

Western China is held to have been an infected place for hundreds of years. But the beginning of the plague of modern times took place in the region of South Kwantung. Thence it was carried to Canton and Hong Kong in the year 1894. Shortly afterwards Amoy became infected.

It is very interesting to trace its subsequent course. Let me direct your attention to the map. There are two main routes whereby Changpoo may be approached. The first is viâ Pechuia, Koa-jim, and Tîgkîo. From Amoy to Pechuia the journey is undertaken in large junks, many of them infested with rats, and of which a large number are engaged in mixed trade. The journey takes but a few hours, and, as might have been expected, shortly after the plague broke out in Amoy, rats and subsequently men succumbed at Pechuia, and plague has been

endemic there since that time. From Pechuia to Koa-jim one travels by small flat-bottomed boats, and the trip takes several hours. The plague appeared in Koa-jim for the first time in 1900, and was preceded by the usual rat mortality. It was not very severe and ceased about the end of July, to reappear in a severer form in the month of May, 1901



Between Koa-jim and Tngkio, the journey must be performed on foot, or in sedan chair, and several high plateaus have to be crossed. There is a river, but it is exceedingly shallow, and almost unnavigable. From Tngkio, where the plague has not yet appeared, to Changpoo, one meets with the same description of road, but there is a high and difficult mountain pass to be crossed.

The second route is by sea from Amoy to Kotin. Large junks, some of them rat infested, go round laden with kerosine oil, food stuffs, &c. From Kotin they can ascend the river to within four miles of the city, and flat-bottomed boats can go right up to the

city gate when the water is high.

There is one other trade route which must be taken into account. In the region around Pehsoa are a scattered set of villages whose inhabitants are fishermen, and who send large junks down to Hong Kong with fish.

As I have before stated, in 1894 plague appeared in Pechuia. This place is almost on the sea-level and to strike further inland a high mountain pass must be crossed. The significance of this will be

seen later on.

The second place in which plague appeared, was the set of fishing villages around Pehsoa. In 1896 several men were brought home suffering from plague (from Hong Kong) and died shortly after arrival. Immediately on the back of this, a rat plague commenced, and rats died off in numbers. From this time the plague spread into all the villages in the neighbourhood and also in O-chio, the human mortality being preceded by a severe rat mortality in every village attacked. Then, as the end of June approached, the disease died down. Next year (1897) Kotin became affected. I cannot gather any evidence to determine whether this epidemic was due to a spread from O-chio (about six miles away) or to infection carried by junk from Amoy. In any case it has appeared in both places every year since that time.

In 1897 the disease does not appear to have spread

further.

In 1898 O-chio was more severely visited. A Changpoo man, who had been there gambling, was brought home to the city, suffering from plague and

died, but the disease did not spread.

In 1899, about the end of May, plague started in a house in the centre of the South Street, Changpoo, and about fifteen persons died. There was also a large rat mortality in this area and the plague was spreading, when there came two or three days of tropical rain. The city streets were flooded several inches deep and the plague ceased to spread. How the disease was introduced on this occasion I have no idea, and can obtain no information on the point.

In 1900 there were no cases of plague in the city as far as I can find out, but towards the close of the year it broke out badly at Liok-khe-kio, a small village on the river about two and a half miles from Changpoo,

and there was a considerable mortality.

In 1901 the first real epidemic occurred in Changpoo

city.

I have made careful enquiry in all directions, and have carefully sifted all information before accepting it

as true.

The plague began in the house of a fishseller, (who later on came under our hands for treatment), near the West Gate, which admits travellers from the Kotin and Liok-khe-kio regions. First, a rat or two died in the house, then the fishseller's wife was seized with bubonic plague (right groin) and died after a few days' illness. This fishseller used to go down twice a week to Kotin, where plague was endemic, and bring in baskets of fish for sale in the city, both salted and fresh; this fish on arrival was sorted and in some

instances washed in the house. The time was the first week in April. Within the course of the same week the rats began to die in houses immediately adjoining, and shortly after there were many people attacked in the immediate neighbourhood. At the same time rats began to die in other houses and shops in the city, and as far as I could learn the rat death preceded the inmates attack about a week; but the time was not absolute.

In all the earlier cases which I attended there was no difficulty in obtaining a history of the previous death of one or more rats in the house. As the epidemic progressed, this was not so easily done, and the people became very reticent on the subject. The plague spread with great rapidity, and it is computed that 1,500 out of the 20,000 died before the 25th of June, and 2,000 or thereabouts fled the city. On the 15th, 16th, and 17th of June rain fell in torrents and almost continuously, and the whole of the city was well washed out, parts of it being flooded. The plague immediately declined and was practically finished in a week.

Consider for a moment or two the method of infection and spread of plague. As to the cause of plague there is no doubt, for the micro-organism can be easily isolated and identified. But how is it introduced into the body and carried from person to person?

Putting aside for the moment the pneumonic cases, which I am inclined to believe form a class by themselves, one is left with the bubonic and septicæmic cases, which form the vast bulk of the attacks. And one is at once struck, and this in company with other observers in different parts of the globe, with the remarkable conjunction of the rat mortality followed by human mortality. So much is this the case that the Chinese term for the plague is "the rat plague," and they know as well as the doctors the connection between the two.

#### INFECTION BY THE BITE OF A RAT.

But how does the poison get transferred from the rat to man? Sometimes by the direct bite of the infected rat. This is rare, but the following case will

serve as an example:-

A man was wakened one night by a rat biting his head. It drew blood. When he had struck a light he found the rat dying close to his pillow. It was at once removed. In twenty-four hours he was seized with plague, and in another twenty-four hours was dead, there being no sign of a bubo before death took place.

RAT-FLEAS.

It has been suggested that the rat-flea acts as a carrier for the micro-organism. Certainly there is every probability of this proving to be true. One afternoon I was called to see a rat which was dying of plague in the court of one of the Chinese houses in which some of our servants lived. When I reached the spot the rat, a fine, medium-sized one, had just died, and the stones all round were dotted with fleas, which were rapidly deserting its body. I did not approach nearer than two and a half feet, and then only to sluice the rat and surrounding region with kerosine, but in that short time I acquired two specimens, which jumped on to the bottom of my white

trousers. Altogether I counted off that one rat thirty-

Granted that this flea can bite man, a matter which has been denied, one can easily realise how one rat may spread disease, and how eleven members of a family may all die in a single week from the disease; and this theory fits in with and explains cases like the following:-

(1) There are two adjoining villages about two and a half miles from the city. To both villages cases of plague were carried from Changpoo. In the one six cases were thus introduced; all died, yet the plague did not spread. Why? One fact is striking, the rats (of which there were plenty in the village) escaped infec-

tion, and there was no rat mortality.

Contrast the fate of the companion village. Here cases were likewise introduced and died but shortly after their introduction. Rats began to die in the neighbourhood of these cases, then scattered throughout village, and cases of the disease quickly occurred.

(2) In another village, about a mile outside the city, rats began to die in the house of a stone-cutter who had not been out of the village for two months. In a week more he was attacked with the disease and His house was the nearest in the village to the

main highway.

(3) A woman, on rising in the morning, found a rat which had died during the night close to the head of her bed. In a day or two she was taken ill with plague and a cervical bubo developed in the more superficial upper cervical glands and on the side next the place where the dead rat had lain. It was impossible to identify any special insect-bite in this area, but the occurrence is suggestive.

But how does the rat become infected in the first place? My own opinion is, by means of infected food. As is well known, rats are voracious and by no means

dainty feeders—all is grist to their mill.

Take the case of the fishseller who may have brought home an infected load of fish from Kotin. It is washed and sorted at home, but during the night the rats got at it and start the ball rolling, the disease spreading like wildfire from rat to rat without the necessity for a fresh infection.

#### FOOD INFECTION.

As to how the food gets infected it is doubtful, but

there are many open avenues.

(1) I have seen men, with and without suppurating buboes, handling fish, vegetables and cakes, and even selling the same on the streets.

(2) A pneumonic case is another source of danger. I have seen such a one expectorating all over the room with its earthen-floor and the fowls and dog

eating up the sputum.

(3) A third source of infected food is the bodies of those who have died of plague. Many instances of corpse-eating by rats could be put on record, and I know of several cases where plague bodies have been gnawed by them. During the present year (1901) a plague body was buried hastily in a mat in some ground near a missionary institution, which stood some distance away from other Chinese houses. It was found that the grave had been entered by rats, and they were seen leaving its vicinity. In a day or

two rats began to die in the portion of the institution nearest to the grave, and a small outbreak of plague occurred.

#### DID RATS INFECT CHANGPOO?

But it may reasonably be suggested that the Changpoo epidemic was due to an immigration of infected rats from the outskirts of Liok-khe-kio to the city. There is no doubt that rats do migrate from unhealthy to healthy places. Our own mission houses may serve as proof. Standing in a fine compound, shortly after the plague began, we were troubled with these nightly visitors, who in numbers got into our ceilings and raced around the verandahs at night. On one night there was a large number of these on the verandah who made a deliberate attempt to get in through one of my glass window-doors which was closed. With the cessation of the epidemic these entirely disappeared, presumably having gone back to old haunts.

But the evidence against the theory of the infection

of the city is weighty.

Firstly, there is a large suburb outside the West Gate, which should have been first attacked, but was

not affected till long after the city.

Secondly, if there had been an invasion of infected rats, one would have expected a much more general outbreak, whereas during the first ten days the disease was localised to a few houses. In some villages, as at O-chio, the disease was certainly carried from village to village by the rats, and it will be noticed by reference to the map that, whatever be the reason, the course of the disease has been on the level, and that where roads had to pass over mountain passes, as to Tngkio, O'sai, or inland from Pechuia, the disease has not spread in these directions, although there are regular trade routes over these passes.

But passing from the share taken by the rat in spreading the disease, are there not other channels of infection? A second channel of infection is directly by means of infected food. In a village which is as yet uninfected, a woman, whose sole connection with the city is that some of the food she eats was brought from there, develops an attack of plague with a tonsillar gland bubo. There was no doubt about the diagnosis, and although very ill she pulled through. Instructions were obeyed and the village has not had another case of plague. There has been no rat mortality

As I have previously stated, the people are extremely careless in this respect, those recovering from plague handling and hawking food: and the flies in Eastern lands are so numerous and persistent in their attentions that they may easily carry infection and so poison the food. As to whether this is a common mode of infection it is difficult to form conclusions. On the whole I think the evidence is against that view.

#### INFECTION BY AIR-PASSAGES.

A third channel of infection is by means of the respiratory passages. I presume most of the cases of plague pneumonia arise in that way. This would explain the occurrence of more cases than one in the same house with much the same clinical features, The sputum in these cases swarms with the bacilli, and in some is a pure culture of the same; and it is easy for those who attend on such a patient, who is distressed, and towards the end sometimes fighting for breath, to contract the disease by inhalation as he splutters and spits about the room. Fortunately these cases are not very common.

#### INFECTION BY THE SKIN.

A fourth method of entry is through a small wound in the skin. I am inclined to think that the existence of this as a separate channel of infection depends on the introduction at the same time of other microorganisms. If the plague bacillus is introduced alone and in small quantity the skin lesion is probably trifling, but when another poison is superadded you get the following class of cases. A small bulla develops at the site of inoculation. Simultaneously a bubo appears in the glands supplied by this area, or at the least within an hour or two, and the fever also begins at the same time. I have seen four cases of this nature. It must be clearly understood, that in these cases the local reaction precedes or is co-existent with the commencement of the fever. In due course the bulla may dry up and form an eschar, or may spread and the skin in this region become gangrenous. These gangrenous patches are distinct from those which come on during the course of the disease and are more of the nature of a pyæmia, as in a case to be narrated subsequently.

But after all is said, one must confess that as yet the exact method of infection in the majority of cases

is, to say the least, obscure.

#### AGE, SEX, AND OCCUPATION.

Age, sex, and occupation, have but little influence on the incidence of the disease. Babies of a month or so old I have known to get it, and old men of 70 to 80 years of age likewise contract it. But the young and strong form the bulk of the cases. A moderate temperature seems to be the most favourable for its development. The Changpoo outbreak began at the commencement of the hot weather, which this year has been unusually moderate, not over 90° in the shade while the epidemic was rife.

#### THE EFFECT OF FLOODS.

One etiological factor seems to me of distinct importance. It will be noticed that the small outbreak of 1899 and the severe one of 1901 both ceased after the flooding of the city with rain-water. What is the connection? It may be a mere coincidence, but it looks as if the thorough cleansing of the streets, and in many cases the houses also, had contributed to its removal. The underground locations of the rats were probably flooded, many drowned, and the rest driven out. Against this view is the fact that these rats seem to like the rafters and eaves quite as much as their earth or drain homes.

As has been previously noted by other writers, the earlier cases of the epidemic were for the most part most severe, and septicæmic and pneumonic cases were by no means uncommon at the commencement. Death in some cases occurred in from twelve to twenty-four hours of the first symptom.

#### SIGNS AND SYMPTOMS.

The clinical characters of the disease have already

been fully described by other writers, and I confine myself to a few notes.

As to premonitory signs and symptoms, my experience is that, as a rule, they are absent. The disease may, however, be ushered in by malaise of a few days' duration.

In one case there were distinct premonitory symptoms. My own horse-boy came to me on a Thursday morning complaining of pain in the glands of both groins. These were palpable and perhaps a little larger than usual, but not enlarged, and there was not a trace of tenderness on pressure. The temperature was normal. On Friday and Saturday he was still complaining, but there was no sign of disease, his temperature was still normal, and he carried 70 lbs. for me fourteen miles on the Saturday. On Sunday, about mid-day, he began to have fever, and on Tuesday buboes developed in both groins. Shortly after nearly all the glands in the body became enlarged, and he died on the eighteenth day of plague, which had become pyæmic.

#### SKIN RASH.

In three cases I have seen rashes, two of these being purpuric, and one (the case narrated above)

pyæmic.

In this case, at the end of the first week papules of varying size developed all over the body, on an erythematous raised base. On the second day they were crowned by a vesicle which grew till the whole papule was transformed into a large bulla. If left to itself this burst, and then an eschar formed on its base, which, separating, left a shallow ulcer. By means of a capillary tube I removed some of the fluid from one of these bullæ and inoculated an agar tube with it, obtaining a pure culture of the plague bacillus.

#### SCROTAL INFLAMMATION.

In two cases inflammation of the scrotal tissues seemed to take the place of a bubo. In both cases this inflammation appeared on the third day of illness, and was intensely painful. One case died on the fifth day, while the other recovered after a severe illness, followed by a tedious course of suppuration in the scrotum, which involved the testicle and led to the sloughing of a portion of the latter. In both cases the inflammatory process was on the left side.

#### TEMPERATURE IN PLAGUE.

It is difficult to dogmatise as to the typical temperature of a plague case, but it seems to me to resemble that of a case of smallpox more than that of any other infectious malady. We have the initial high rise, gradually descending on or about the third day as the bubo appears, and rising again for a time as the bubo maturates. It is always a grave sign if the temperature remains steadily high and refuses to fall, and the same may be said of the secondary rise if severe and prolonged. In some cases there is no secondary rise at all, and these are usually mild cases.

#### CEREBRAL SYMPTOMS.

Stupor or delirium are serious symptoms, especially the former. But a patient who is absolutely unconscious may, under careful treatment, recover. A

delirium which verges on insanity is a sign of almost fatal import. Here are two illustrative cases:—

An old table-boy of mine, aged 23, was seized with an attack of septicæmic plague. When I was called to him about five hours after the commencement, he was in the following condition: His temperature was 105°, and he knew me, and when spoken to firmly, would answer and obey. Otherwise he was sometimes sitting up and sometimes lying down, chattering and laughing to himself. He assured me he was quite well and had no pain, but as soon as his attention was diverted, his face would relapse into its bright smile, and he would act as though he was relating some funny story or listening to the same. In a few hours this passed into stupor, and he was dead within the twenty-four hours.

Another young man, aged 26, was seized with plague. I was called to him at the end of thirty hours. A bubo was then developing in the groin; but he was also wildly maniacal. When I entered he made a dash at me, and was with difficulty restrained by his friends. Then he tore off his upper garment and poured out a string of curses on his friends for meddling with him. After a lot of persuasion I got him to drink his medicine and lie down. But no sooner was my back turned than he was up again and as bad as ever. In a few hours collapse came on, and before the close of forty-eight hours from the commencement he was dead.

CONJUNCTIVAL AND CARDIAC AFFECTIONS.

There are two marked features about an attack of

plague which materially aid diagnosis.

One is the suffused injected conjunctiva, sometimes amounting to an actual conjunctivitis. This is more marked than is the case in high fever from other causes, barring severe æstivo-autumnal fever, which can be at once excluded by the microscope; and measles, in which lachrymation and coryza are distinctive features. It is an early and usually well-marked sign. The other is the rapid failure of the heart, as if a direct heart poison were being produced and set in circulation. From the first the pulse is rapid, and in a few hours it may become weak and almost uncountable. Actual attacks of syncope may occur and may be of prolonged duration, but as a rule an attack of syncope is only the prelude to the end.

Here is an exception: I am informed that a man in the North Street, Changpoo, who was suffering from plague, rapidly became worse, finally collapsed, and was supposed to be dead. His relatives procured a coffin, put him in it, and went out to hire bearers. It was a wet night and they could procure no one. Fortunately they did not cover the coffin. At midnight, or some six hours after his supposed death, the man sat up and asked for tea. He ultimately

recovered.

One or two more cases of a *subpneumonic* type have been seen. They had fever, blood-tinged sputum, small in amount, but little increase of frequency of respiration, and died after five to seven days' illness. Clinical examination revealed a little broncho-pneumonia, but no striking physical signs.

CASES OF ADYNAMIC TYPE.

Also three or four cases of an adynamic type have presented themselves for treatment.

In these cases the temperature keeps low, say, 99.5° to 100°, the patient is collapsed and cold, and the bubo develops slowly. These are mostly patients over middle age, and the mortality is high. One case is interesting as showing the result of playing with the disease.

A man, aged 45, an opium smoker, had been under treatment for eight days and was getting better; temperature, pulse, and appearances improving. He got restive and got up to go and have a smoke at his favourite drug. He had it, came home and lay down on his bed and was dead in half an hour.

#### TREATMENT.

As to treatment. I have not had any opportunity up to the present of seeing the results of the use of serum as a prophylactic or curative agent. During this epidemic there was no chance of securing a supply, but it should certainly be used whenever possible. Foremost among the remedial agents I should place good nursing. None of the Changpoo cases had any nursing beyond that afforded them by their own friends. But in my own cases even the small amount they secured made a great difference to the chances of the case, and this was specially marked among those who were willing strictly to obey orders.

The mortality rate was about 65 per cent. amongst our cases and was considerably lower than amongst the untreated, of whom, as far as I can judge, about 90 per cent. died. It may be said that the epidemic was a mild one. If the proportion of pneumonic and septicæmic cases be taken as a criterion I think this

was not the case.

Pneumonic plague is the most fatal of all the forms and I have never yet seen one recover. Septicæmic plague is the next in point of danger, but a number undoubtedly pull through. Bubonic plague is the least fatal of the three forms.

#### CARBOLIC ACID.

As far as my observation went, carbolic acid in large doses appeared to give the patient the best chance. It brought on profuse sweating and seemed in some way to neutralise the toxin manufactured by the

plague bacilli.

As an illustrative case let me quote the following: A young man, aged 26, who had been engaged in burying plague corpses, was attacked with high fever, pain in the right groin, and rapidly became unconscious. I injected 6 grs. of pure carbolic acid dissolved in water hypodermically. Within two hours he had become sufficiently conscious to take another 10 grs. by the mouth. This brought on profuse sweating. In the evening (eight hours after the first injection) he had another 10 grs. of the pure acid. He rapidly improved and his groin bubo, which was enlarging, began to subside. Then he became reckless, got up and had a relapse, which yielded to a repetition of the same treatment, minus the hypodermic injection. It was hoped at one time that carbolic acid would prove to be a specific remedy, but such is manifestly not the case and there are many points about its action which are as yet obscure. Why should it in one case of plague act like a charm and in another apparently similar case have no effect whatever?

Why do these patients not get carboluria? One of my patients may have had carbolic acid delirium, but I was by no means certain of the diagnosis, and with the exception of this case I have not seen it.

The best way to administer the drug is mixed with plenty of rice water, which being mucilaginous prevents the irritative action of the carbolic acid on the stomach, and as this can be obtained in any Chinese home it is peculiarly convenient for those who work among this people. If possible, 30 to 60 grs. should be administered in the first twenty-four hours.

#### GENERAL TREATMENT.

Combined with this treatment, the appropriate general treatment of each case should be carried out. The bowels must be kept freely open, and diarrhoa, unless excessive, need not be checked. In the early stages a calomel and jalap purge is very useful.

stages a calomel and jalap purge is very useful.

Digitalis is very useful in sustaining the heart's action. It cannot be spoken of as a specific, but in some cases acts with great success. The same thing may be said of strychnine, which in hypodermic injection is often invaluable. But when all is said, one must confess that plague, rather than the physician holds the field. Trustworthy men have, from time to time believed that a specific remedy had been found. At one time it was Yersin's serum, at another calomel, then digitalis, and finally carbolic acid. Time alone will show what is the true worth of the pretensions of the latter drug. The best treatment for plague is prevention. I am not willing to acknowledge that sanitation and like measures count for little.

#### PREVENTION.

In Changoo the hospital is touched by Chinese houses on three sides. In each of these houses there was plague, and in one a most virulent outbreak. But the hospital, which was kept rigidly clean, remained quite free, although, in spite of the panic, there were thirty to thirty-five in-patients who were not confined to the hospital. Several cases of plague were brought in, but sent home at once. Chinese students, eight in number, went regularly with us to the homes of the patients. They took the same precautions as ourselves with regard to careful washing and the use of flea powder, and none of them took the disease. Rats were looked for and hunted down, the dead ones being burnt at once, without handling, by drenching with kerosine and applying a light. There is little doubt that the most important means of prophylaxis is the stamping out of the rat. In some places a severe attack of plague has been noted, once in two years; and this has been attributed to the rats having had insufficient time to make up for the numbers that had perished during the first year.

In some places it might be possible to reproduce artificially the condition which appears to have arrested the plague at Changoo, viz., the flooding of a plague area for at least twenty-four hours with fresh or salt water. In some places this would not be difficult to accomplish.

DENTAL CARIES.1

By Kenneth W. Goadby, L.D.S.Eng., D.P.H.Camb. Dental Surgeon to the Seamen's Hospitals.

To attempt the discussion of all the various theories that have been from time to time advanced to explain the phenomena of dental caries and to point out all the fallacies therewith connected is outside the limits of the present lecture, and I propose to only deal with what seems, in the present state of our knowledge of bacteria, to be the most rational and acceptable explanation.

In the first place the tooth as a tissue is unique, it contains the least amount of organic tissue of any other part of the body, while it is covered with a structure, the enamel, almost devoid of any organic matter at all, the carbonates of calcium sodium and phosphorus having replaced the organic matrix in a manner which may be compared to the formation of fossil wood.

Enamel, therefore, is devoid of physiological reaction to pathological or other stimuli, and we are unable to apply to it the ordinary picture of inflammation as seen in other tissues, including compact bone; it follows that the only explanation that we can properly apply to dental caries is an essentially mechanical one.

THE FIRST POINT OF ATTACK.

In the great majority of cases the first point of attack in dental caries is the interstitial surface of the tooth, the next the crown fissures, and is due, as we shall see later, to the action of acids, produced by bacteria from the food, upon the lime salts of the enamel covering. The enamel at the seat of attack is seen microscopically to have lost some of the cementsubstance which intervenes between the contiguous enamel prisms or irregular rods of which the enamel layer is composed. This cement-substance disappears first when a thin slice of enamel is decalcified under the microscope, and at the same time it will be observed that the interstitial substance passes into the enamel rods, producing a structure that may be compared to a series of pill-boxes arranged end to end with a disc of paper between each. These offsets also dissolve away in the acid, and produce, in caries, a great friability of the enamel at the affected spot.

As the process of destruction progresses, the bacteria file into the capillary channels and gradually approach the dentine as their acid fermentation softens and dissolves the enamel rods.

Dentine or ivory, which makes up the large bulk of the tooth, is nearly related to bone; it is permeated with fine canals called dentinal tubules, homologous with the canaliculi of bone, communicating at the enamel surface with the interglobular spaces or lacune, and at the centre of the tooth with the pulp chamber. Once the dentine is reached a change takes place in the process dependent on the structure with which we are dealing. The dentine matrix is similar to that of bone, and when softened by removal of the lime salt is capable of digestion by the proteolitic

<sup>&</sup>lt;sup>1</sup> A lecture delivered to the students at the School of Tropical Medicine, London.

enzymes formed by many bacteria. Coincident therefore with the decalcification of the dentine, digestion takes place by the enzymes of certain bacteria, most of which are facultative anaërobic. The combined result is a gradual hollowing out of the interior of the tooth until the edges of the cavity break away, revealing the underlying decay.

The bacteria concerned gradually pass along the dentinal tubules and reach the pulp, which already lowered in its resistance by the toxines that have filtered along the canals, succumbs generally with the

well-known symptoms of acute toothache.

Further, the blood-vessels which supply the pulp are derived from those of the dento-alveolar periosteum, and infection is conveyed along them to the bone and soft tissues. In this way a large number of the tubercular glands in the necks of children are brought about, the tubercle bacillus either passing in through the route indicated, or else circulating in the blood is brought to some gland already in a state of chronic inflammation as the result of neglected carious teeth, often of the first dentition. The weakened gland is quickly infected.

Such then, is a brief outline of the phenomena of

dental caries.

#### FOOD STUFFS.

We will now consider the process a little more in detail in its earlier stages.

Food stuffs, as you are aware, consist of three main classes. Of these proteids and fats are of little importance in the present connection. Proteids are fermentable by bacteria in the changes of putrefaction with the formation of some of the organic acids such as oxyphenyl-propionic acid and oxyphenyl-caproic acid. Proteids, however, are only acted upon when all the carbohydrate present has been changed, so that in a diet consisting of a large proportion of carbohydrate such organic acids are present in only the most minute quantities. Very little is known about the fermentation of fat, but probably fatty acids and glycerine are formed to some small extent.

With carbohydrates the case is different, many bacteria attack them and of these bacteria many representatives occur from time to time in the mouth.

Of the three classes of carbohydrates the monosaccharides are the most easily acted upon, whereas the di- and poly-saccharides are not so easily fermentable, but require preliminary inversion either by a ferment produced by the one organism or by another organism working in symbiotic activity with the first.

The change that is effected is the addition of a molecule of water changing the di- to the monosaccharide. The end product is generally lactic acid, although other acids such as acetic or butyric may be formed in small quantities.

The general equation is thus:-

(1) 
$$C_{12}H_{12}O_1 + H_2O = C_6H_{12}O_6 + C_6H_{12}O_6$$
  
(2)  $C_6H_{12}O = 2 C_3H_6O_3$ 

Some of the mouth bacteria seem capable of directly fermenting the di-saccharides, particularly maltose and iso-maltose, an interesting fact when we consider that the chief end-product of ptyalin on starch is maltose; and we must bear in mind the significant facts of the large place that carbohydrates have in the dietry of those convalescent from various acute diseases, and the frequency with which caries dates from such an illness.

#### MOUTH FERMENTATIONS.

Turning now to the point of view of the fermentation physiologist we are reminded of the fact that in all natural fermentations, that is those occurring spontaneously in nature and not by art, the class of food stuff in a given solution largely determines the class of organisms present; thus, to take a general illustration, crude wine must, when it comes from the press, contain a vast number of species of bacteria derived from the skins of the grapes, from the workers' hands, the air, and other sources. In the usual course of events, however, alcoholic fermentation takes place. The yeasts present in the medium finding the conditions fitted to their development increase in great quantities, with the result that an alcohol is formed. When the alcohol has become of a certain percentage the action ceases and the advent of another or acid fermentation is ushered in. The bacteria producing this were present in the original, but owing to the alcohol on which they thrive being unformed were unable to develop. This acid fermentation only ceases when all the alcohol present has been changed to acetic acid. A third series of bacteria now come into operation, contained like the previous two series in the original must; these bacteria ferment the acetic acid to CO<sub>2</sub> and water, changing the reaction to neutral or faintly alkaline. The putrefactive bacteria now come to the front and from the remaining proteid present produce the various evil-smelling products which are associated with putrefaction.

Such a sequence of events is termed a "metabiotic cycle," one class of bacteria preparing the way for the operations of another; while when two or more bacterial species work together the process is termed "symbiotic." It is most probable that dental caries

is produced in this manner.

So far then, it is evident that carbohydrate food and fermentative bacteria have an important bearing upon the question of caries, and that proteid, that is, meat diet, has little relation to tooth destruction.

#### CARBOHYDRATES AS A PREDISPOSING CAUSE OF CARIES.

Let us now examine the evidence which points to the special effect of carbohydrates as a predisposing cause of caries.

If the problem were only one of the presence of carbodydrate food it seems strange that any teeth should escape, and with such a proper critical point

of view we will proceed in our enquiry.

In the first place, if we examine a section of tooth enamel showing one of the interstitial or apposing surfaces of two contiguous teeth from a mouth in which caries is well marked, we find curious feltlike masses of bacteria attached to the enamel. Under this bacterial sheet the enamel is seen to be in an incipient stage of caries with the destruction of the intercolumnar substance. If now we make a culture from a part of such a tooth we find that there are frequently present organisms which produce a curious thick, gelatinous growth, which is most difficult to remove from the culture tube. If now we suspend a tooth in a fluid medium containing such a culture we can reproduce the same layer upon the tooth surface.

If a culture tube containing some carbohydrate is now substituted for the previous experiment and inoculated with an organism capable of producing acid fermentation, it is found that the same changes in the enamel are produced that we have seen are found in the tooth in the mouth. Moreover, even if the organism producing the stringy growth is not of itself an acid producer, many other bacteria will grow in symbiotic relation with it and produce the foregoing changes. In media containing no carbohydrate, that is for instance in inosite free broth, no such change occurs. Sometimes the plaque-forming bacteria will form curious dotted colonies upon the surface of the tube, especially when potassium nitrite is added to media. These plaque-forming bacteria are common in carious mouths. In normal healthy mouths entirely free from caries almost the only species present is the Streptococcus brevis of van Lingelsheim, whilst when caries is present acid-forming bacteria are in considerable numbers. Our initial hypothesis then shows considerable likelihood of proof, and we may, I think, conclude that:-

#### CONCLUSIONS.

- (1) Carbohydrate food tends to the furtherance of dental caries.
- (2) Acid-forming bacteria are the ones largely responsible for the process.
  - (3) Proteid will tend to the reduction of caries.
- (4) Fermentative bacteria of the putrefactive class, in that they tend to produce an alkaline reaction, will also prevent the development of rapid caries.

## TEETH OF NATIVES OF THE TROPICS AND EUROPEANS COMPARED.

You are all aware of the remarkable difference that exists between the teeth of the average native and that of the average European. Have we therefore any data in what we have seen to be a logical explanation of dental caries to account for this extreme difference, so great in fact that in Europeans the percentage with carious teeth is 87 to 90 per cent., while in the whole of the various native races of which I have statistics it does not exceed 30 per cent.

Firstly, so far as my somewhat limited experience goes, I find that the enamel of native races, that is, Negro and Negretto, as apposed to Xanthrochroi and Melanochroi, rarely shows microscopical defects and irregularities while in Europeans it is seldom possible to find all the teeth free from even macroscopic irregularities.

Secondly, owing to the effects of sexual selection on the type of beauty and hence the gradual establishment of the most admired type, as well as the larger development of the frontal lobes of the cerebrum, the facial angle has considerably altered and with it the superior maxilla has become contracted with concommitant crowding of the dental arch. The teeth have remained for the most part the same size, with the result that irregularities and crowding are common and a very fruitful cause of caries. It is in this species of mouth that caries is so common.

Thirdly, the general physical condition of food stuffs differs; the coarse, hard and fibrous food is no longer used, and its cleansing effect on the tooth-surface is replaced by the soft, smooth variety of food so commonly consumed.

The following table gives the percentage of caries in certain native races; it is by no means complete, and I shall be much obliged for any information that you can give me, derived from personal observations concerning: (1) Caries (a) temporary dentition; (b) permanent dentition. (2) Food. (3) Habits of mouth cleansing.

The few direct experiments I have been able to make concerning the bacteria present in the mouths of natives tend to show that the flora is nearly related to that of the monkeys from which I have been able to obtain cultures. In all cases examined putrefactive bacteria were present in large numbers, the number of acid formers being small.

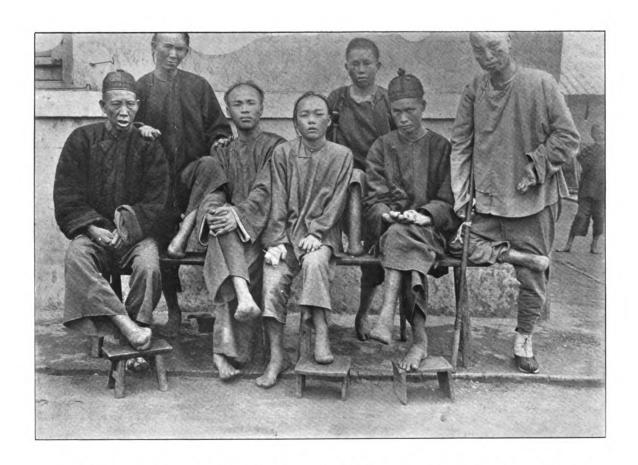
#### To PREVENT CARIES.

The practical question that arises at the end of our enquiry is, what steps can be taken to arrest caries or to prevent its appearance? Much may be done by proper attention, and such attention should date from the appearance of the first temporary tooth, particularly in hand-fed children. The use of teat comforters should be absolutely forbidden. The mother, as a rule, takes no notice of the teeth that are carious till often all the temporary teeth as well as the first molars have been attacked, and then even, do what we may, the mouth teems with the organisms specially related to caries. The use of the tooth-brush should be taught early, as well as the more efficient "dragon cane," or its equivalent. The following formulæ may be suggested as of general use:—

Pro	phylactic.					1.0	
	Magnesia Carbo	nis				38s. ·	
	Lysol					m xii.	
	Aq. Rosæ					Ziij.	A
5i. to	be used night	and	mornin	g, and	slu	ced well	round
	tifrice.		13.1				
	Creta Prep.					<b>7i.</b>	
10	Pulv. Saponis de	eni.				ğij.	
	Pulv. Iridis.					311.	
	Pulv. os. Sepia					5i. 3ss.	
	Sodæ Bicarb.					388.	
	Lysol						
	Saccharine			4.6		gr. i.	
	Otto Rose					m viij.	
Mou	ith wash.						
	Formalin (40 %)					m ij.	
	Aq. Rosæ					ξi.	

#### TABLE SHOWING APPROXIMATE DISTRIBUTION OF CARIES.

								PER CENT.
Esquimaux	(diet	: meat	only)		2.			1.4
New Zeala	nders							3.02
N.W. Coas	t Ame	rica (di	et: dr	ied fisl	h)			3.9
North-Ame						oots)		4.5
Fiji Island								5.2
Northern I	ndia (	diet: v	egetab	les and	I whea	t)		5.9
Eastern Po								11.4
Southern I								14.08
Zulu Kaffin							t)	14.2
Sandwich								19.04
Australian								20.4
Bushmen (					&c.)			24.6
African Sla								24.6
Tasmanian				-0-000	/	- 4.		27.2
European								87 to 90



PHOTOGRAPH SHOWING RESULTS OF "AMPUTATION FOR PERFORATING ULCER OF THE FOOT IN LEPERS."

See an article on this subject by Edward Horder, F.R.C.S.Edin., in the Journal of Tropical Medicine, Jan. 1st, 1902.

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THE

## Journal of Tropical Medicine

JANUARY 15, 1902.

MR. JONATHAN HUTCHINSON'S VISIT TO THE LEPER SETTLEMENT ON ROBBEN ISLAND, CAPE OF HOPE.

Mr. Hutchinson has gone to South Africa on a self-imposed mission and with a philanthropy of purpose alike admirable and creditable. We may safely say every one is acquainted with the attention Mr. Hutchinson has paid to the subject of leprosy, and most are aware of the beliefs which underlie his opinion as to the cause of the disease. Irrespective of any question of the elucidation of the cause, Mr. Hutchinson's visit is sure to prove of great value to the study of leprosy in general. His name has been associated for so many years with all that is best in clinical and scientific investigation and teaching, that medical literature is sure to be enriched by his visit. We do not think, perhaps we do not hope, that the visit to

Robben Island will alter Mr. Hutchinson's views, either as regards the question of the segregation of lepers, or the part played by eating uncooked fish in the etiology of leprosy. His beliefs are not founded on any ephemeral basis, they are the result of serious thought and close observation, and we cannot conceive that the experiences gained in a leper settlement are likely to upset his conclusions. It must, however, be said that neither of Mr. Hutchinson's contentions have Few, very few, are gained many followers. willing to allow lepers to wander freely amongst a healthy community, and still fewer accept his theory of uncooked fish as a cause. That does not, however, prove that his arguments are wrong. It may be that all Mr. Hutchinson states and believes in regard to the matter is correct, but most regard his contentions as "not proven."

At the present day scientific thought demands more exact information than mere speculative opinion, however well-fitting that opinion may appear to be. Mr. Hutchinson, however, bases, or holds that he bases, his opinion on the surest of all foundations, namely, clinical observation, and clinical observation has been, is, and ever shall remain, the ultimate appeal.

Leprosy being a proved bacillary disease, should fall into line with other similarly originated diseases, and should afford all the evidence which it is necessary to furnish according to the maxims of the bacteriologist. But even should it do so, are we to accept the bacteriologist's word as final? We regret that it should be so, but bacteriology is not yet an exact science, it is only on its trial, and while willing to attribute to bacteriology a prominent place in our means of research, we cannot place it, as yet at all Observation of the behaviour events, higher. of disease, although confessedly slow in attaining to any real exactitude, yet remains our surest and our safest guide to scientific precision, and all our "'ologies" must yield to the truths to be gathered from experience and observation.

The whole question, then, of Mr. Hutchinson's dogma turns on the truthfulness of his observations. That they are made with care and openmindedness, all who know Mr. Hutchinson are well aware; but even the wisest and most careful of men may fail to interpret their observations correctly. That Mr. Hutchinson has done so is an open question, and one cannot set aside the opinion of this, our greatest clinical observer, by mere empiric statements.

By his visit to Robben Island, Mr. Hutchinson has set an example to the younger and to the older members of our profession; he goes to see for himself, to gather facts on the spot; and whatever his conclusions may be he will be listened to with respect, if not with conviction, and his observations are sure to furnish us with a fresh and reliable source of valuable clinical material.

THE BEST METHOD OF ADMINISTERING QUININE AS A PREVENTIVE OF MALARIAL FEVER.

By Edward Henry Read, M.R.C.S., L.R.C.P., L.S.A. Lagos, West Africa.

THE best method of administering quinine as a prophylactic depends entirely on the individual, and his or her state of health.

For ordinary purposes we may divide individuals into three classes: (1) Adult male; (2) adult female;

(3) children of either sex.

CLASS 1.—If the person is in perfect health there is no simpler or better way than using the tabloid of a soluble salt, preferably the bihydrochlorate. If the digestion is good and the bowels are regular it never fails to be absorbed. If the person is suffering from constipation or dyspepsia the tabloid can never be depended upon and should not be given. In such case the solution is no doubt the best, but as there are very few who do not object to the taste of quinine which in many people produces actual nausea—it is better to find some other method of giving the drug. As it is only for prophylaxis and not cure, hypodermic and rectal injections are out of the question. If the person is in the habit of taking porridge for breakfast, a very simple way is to mix the powder with the first spoonful of porridge and then swallow. Given in this way the bitter taste is hardly perceptible, and passes away with the next spoonful of porridge. I have persuaded many people to take it in this way when I could not get them to take it in any other. Another good way of taking quinine is in milk. Mix the powder with a tablespoonful of milk and swallow, after having first lubricated the mouth with a little bread and butter; given in this way the bitter taste of the drug is not perceived (vide "Tropical Diseases," Manson, 1900 edition, p. 134).

I think that there are very few people who cannot take quinine in one of the above ways.

Dose as a prophylactic.—15 grs. every fifth day; 15 grs. once a week is not quite reliable, and 5

grs. every day I think is too much. For the first three years of my residence on the west coast of Africa I took 5 grs. of quinine every day, and although I practically had no fever, there is no doubt that the daily dose of quinine has had a deleterious effect on my digestion. If the stomach is given four days' rest between taking the larger doses I do not think the stomach will suffer much even if the drug is continued for many years. For the last nine months I have been taking the larger dose, and I have not had the slightest touch of malarial fever, and I have found no parasites in my blood during this period.

CLASS 2.—Adult female. In ordinary circumstances I think that they should proceed in the same course as class 1, except the dose should be smaller—8 grs.

to be taken every fifth day.

Women, as a rule, cannot stand as large a dose as men, and suffer much more from the effects of the drug. Again, they do not require it for the following reasons—they are not so robust, have not the same quantity of blood to be saturated with the drug, and are not so exposed to the vicissitudes of the weather.

Pregnant Women.—There is no harm in pregnant women taking quinine as a prophylactic if the dose is given regularly from the commencement of pregnancy. Although quinine does produce abortion in rare cases, I think it is only in women who are prone to abort. In these cases I think that one fever fit is much more likely to produce abortion than a regular course of quinine. I have given quinine to pregnant women in fairly large doses without any untoward result. I think that 8 grs. is rather too large a dose to be taken by pregnant women, and I should recommend a daily dose of  $2\frac{1}{2}$  grs. during the whole period of pregnancy.

CLASS 3.—Children of either sex. There is great difficulty in administering quinine to children on account of their repugnance to the bitter taste; also their various ages have to be dealt with, and the dose as a prophylactic worked out in each case. Quinine can be administered by sugar-coated tabloids or by chocolates containing the drug, but I have had no experience with either and cannot say whether the drug is absorbed when given in this way. A fairly good way of getting children to take it is to put the powder into a spoonful of milk, followed by a spoonful of jam or honey. In this way one can often get them to take it and the quinine is certain to be absorbed.

Doses for children as a prophylactic: Under 1 year, ½ gr. every third day. One to 5 years, 1 gr. every third day. Five to 10 years, 2 grs. every third day. Ten to 15 years, 3 grs. every third day. Above 15, the ordinary adult dose.

In summing up the foregoing, I come to the conclusion that the best way of giving quinine as a

prophylactic is the following:-

Class 1: For adults in good health, tabloids in 15 gr. doses every fifth day. For adults in indifferent health, the solution, if possible 15 grs. of the salt every fifth day. If solution objected to, 15 grs. of the powder in a tablespoonful of porridge, or 15 grs. of the powder in a tablespoonful of milk, to be taken every fifth day.

Class 2: For adults in good health, tabloids in 8gr.



doses every fifth day. For adults in indifferent health, the solution, if possible 8 grs. of the salt every fifth day; if solution objected to, 8 grs. of the powder in a tablespoonful of porridge, or 8 grs. of the powder in a tablespoonful of milk to be taken every fifth day.

For pregnant women, 2½ grs. to be taken daily in either the above ways from the commencement of

Class 3: Children of either sex, age under 1 year, gr. of the powder to be taken every third day in a spoonful of milk, followed by a spoonful of jam or honey. One to 5 years, 1 gr. every third day in a spoonful of milk, followed by jam or honey. Five to 10 years, 2 grs. every third day in a spoonful of milk, followed by jam or honey. Ten to 15 years, 3 grs. in milk every third day. Above 15 years the ordinary adult dose taken in the same way.

### ON THE BEST METHOD OF ADMINISTERING QUININE AS A PROPHYLACTIC AGAINST MALARIA.

By TERTIUS.

I ASSUME that it may be taken for granted that quinine is a prophylactic. There is much evidence for this, and the discussion on the subject at the British Medical Association meeting in 1900 may be mentioned, the general opinion being that it was useful.

I now, therefore, discuss only the way in which it. acts as a prophylactic and the best means of employing it. In the first place I think that there is no doubt that quinine in any dose will not prevent a mosquito from biting the taker of the drug, nor, if infected, from transmitting the organism; so that if, as assumed, it acts at all, it must be by destroying the plasmodium after it has entered the blood.

Now the sporozoites take a certain time to develop into the amœboid form, or to have resulted in sufficient number of the amœbæ to cause an attack of fever, and the organism is probably best attacked by quinine when it is in the amœboid state in the corpuscle; but seeing that the individual, not having had fever, does not know when this occurs, the best method of giving the quinine will be that one by which this stage in the life of the organism will most

probably be affected by it.

By giving a small dose every day it is not at all certain that this time will be the correct one, and if this dose were given at intervals during the day it is probable that only one part of it would be of any use; the remainder would be wasted, and the comparatively small dose which happened to have been given at the right time would, as only small doses could be given for this purpose, be most likely insufficient. The difficulty, however, of getting men to subject themselves to a perpetual multiple daily dosage would render it practically impossible.

I imagine that very few would try to kill the organism, when they knew that a man had it in his blood, by daily doses of 5 grs. of quinine; and I cannot see why they should hope to do so-though it may be possible—when they do not know that it is in

the blood. In fact, small daily doses, though they may be useful, seem to me wrong in principle.

If, however, a larger dose could be given so as to be absorbed at the time during which the organism is maturing-a period of some hours' duration-the end would be achieved.

There are three periods of maturation—twenty-four, forty-eight, and seventy-two hours, according to the organism; and if a dose is taken daily it may obviously hit off any of the organisms; but it may be too late or too early, may be eliminated and wasted, while in the case of the seventy-two hour organism two out of every three doses must be wasted; so the best method is reduced to giving it in such a way that, with the greatest probability and with the greatest efficiency the work must be done, on any one of the different forms of organism.

I believe that this result will be best gained by giving fairly large doses on two consecutive days during the week, and that then, if one dose happens to be useless, the other will probably act on both the quotidian and tertian forms, while if either or both of these doses are too late or too early for the quartan, the following week, if corresponding days are observed, will bring the dose right for it also. In fact, I believe that two doses of 15 grs., given on two consecutive days once a week, will produce better results than 35 grs. taken during the week in 5 grs. daily.

The time for giving it is preferably a short time before bedtime, and then any headache or cinchonism will have disappeared during the sleeping hours. Owing to the European habit of observing the Sabbath, both for the white man and his employes, Saturday and Sunday evenings are convenient. Within the last year I have had the opportunity of seeing the experiment of giving the quinine in the

above manner tried on a fairly large scale.

Near to where I am stationed there is being opened a large sugar estate, which at first, and for nearly a year, was singularly healthy; but then as the number of coolies, and probably of infected coolies, and their children, became larger, fever commenced and rapidly increased, until at last there was a very large epidemic. The type was not a severe one, crescents were never found, and not a large number died, but the sickness rate was very high. There were about 1,200 coolies, and for some time the admissions into hospital were forty per week-on one occasion there were forty in a day, and thirty cases a day was not an uncommon number to be treated as out-patients for the same disease; the loss of labour was therefore very great.

Dr. Paul, who was then medical officer to the estate, decided to try the plan, and, so far as I know, originated it. The coolies were mustered every Saturday and Sunday afternoon, and each was given 15 grs. of quinine sulphate in solution, though capsule or

cachet might be just as good.

The result exceeded his or my expectations; the weekly admission rate stopped almost at once to about twelve, and many of these twelve Dr. Paul was able to show had escaped their quinine ration. There has never been much fever since, occasionally only two or three fever cases in the hospital; and the loss of labour, which at one time was very serious, is now trifling. On one occasion, while I was in charge, I tried 10 grs. instead of 15, but there were signs of an increase which made the manager anxious to get back to the larger dose.

There has been one slight increase, but it was nothing to speak of, the cause I do not know, and it

only lasted a short time.

I would mention that no other preventive measure

was adopted.

I think that this experiment may be considered to have been a success, and to have been on a large scale; the manager would not willingly give up the quinine ration, though the cost is large owing to the number of coolies, but he considers the cost is recouped by the extra amount and efficiency of the labour.

The Europeans on the estate have not taken quinine, but have been fairly free from fever, due, I believe, to the difficulty of anopheles in getting infected, while, if they are infected, they will most probably, from the numbers, rather feed on the coolie who will get his two doses of quinine, and be unharmed.

I believe that for Europeans this method would also be the best, especially for those in bad malarial places, those on expeditions, and those whose occupation renders them liable to infection. For large numbers, such as regiments, jail populations, estate or railway construction coolies, I think it would be found to be invaluable.

# THE DURATION OF THE LATENCY OF MALARIA.

By A. Sims, M.D., C.M.(Aberd.), D.P.H.(Birm.); Certificated London Tropical School of Medicine.

Late Medical Officer Congo Free State, and Civil Surgeon of French Government (Brazzaville).

duration of initial latency after primary malarial infection is easier to account for than the latency observed after a first attack of fever; the former depends upon the number of valid sporozoites trans-stellated by the mosquito, the latter upon degree of acquired immunity. The calculation which follows, to explain the former, presupposes that all the sporocytes, resulting from the injected sporozoites, lived. In most cases all of the spores survive at this initial period. After a first attack of fever it has been shown that this is no longer the case: "the parasites in the first observed cycle were 500, in the second they should have been at least 3,000, in the third 18,000, and at the commencement of the fourth cycle 108,000, it is certain that no such multiplication occurred " (Journal OF TROPICAL MEDICINE, p. 110, April 1st, 1901). One would naturally expect that the spore slaughter would take place now; but it is not so; otherwise the usual incubation period would be longer than five to fifteen days. The mechanism, so to speak, of their destruction is not yet set up; after a first fever it is in action.

From observations and counts done by Dr. Gray and myself (Journal of Tropical Medicine, April 1, 1901), at the Seamen's Hospital, I am led to believe that about 400 fully-grown parasites to the c.mm., or the presence of about two billion adult parasites in the body, is the lowest level of parasites to be borne without clinical

symptoms; more bring on fever which continues till the parasites reach a low and tolerated level.

Case I.-L. A., Seamen's Hospital; double-tertian. The counts were as follows:-

	Half-gro	wn parasites	Fully	grown parasites	Fever
Date	In c.mm.	In body	In e.mm.	In body	Fe
1901 May 10 ,, 11 ,, 12 ,, 13 ,, 14 ,, 15 ,, 16 ,, 17	350 70 Not seen 100 Not seen 700 140 Not seen	1,750,000,000 350,000,000 500,000,000 3,500,000,000 700,000,000	430 280 100 410 50 410 140 70	2,150,000,000 1,400,000,000 500,000,000 2,050,000,000 2,050,000,000 2,050,000,000 700,000,000 350,000,000	10000

\* Fever would have been found here if temperature had been taken often enough.

From the above figures and limit of two billions, it follows that the duration of initial latency depends upon the number of trans-stellated sporozoites.

Malignant tertian, sporulating every forty hours :-6 1st day 8,000 160,000 3,200,000 400 1 parasite

64,000,000 1,280,000,000 = fever on 14th day, or 7th day if two sporozoites were injected.

Benign Tertian : -5 1st day 3,200,000 160,000 8,000 400 20 1 parasite 15 13 1,280,000,000 64,000,000

= fever on 17th day, or on 8th day if two sporozoites were injected.

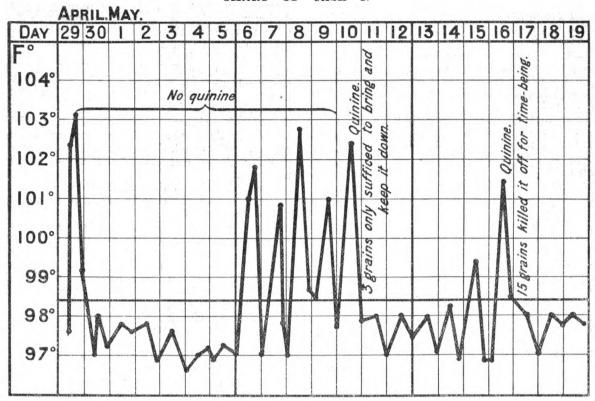
Quartan :-13 10 1st day 100,000 10,000 1,000 100 10 1 parasite 28 25 22 19 1,000,000,000 100,000,000 10,000,000 1,000,000

= fever on 31st, or on 15th or 16th day if two sporozoites were injected.

Ordinarily two only would account for the usually observed incubation period of five to fifteen days; were more injected it would be shorter, and if an "infantile mortality" were established of the sporocytes then it

would be an indefinite period. From the above calculations it is clear that, at this stage, malignant tertian has the shortest latency, next tertian, and quartan the longest. Lengthened variations of the primary latent period (incubation) have been observed. Some individuals have had fever for the first time on coming home. A student of the London Tropical School lived in Nigeria a year and had fever for the first time on sighting England; probably infection took place at the moment of departure. Cases are recorded of a long time before first symptoms appeared, though the parasites were there; possibly the initial fever, which occurred at the fixed time, was slight and unobserved. The primary latency is generally five to fifteen days, and nine months might elapse before a second attack (in England), as in the case of Dr. Manson, jun., and Mr. Warren, of the Tropical School; in another case it was well over a year before a second attack occurred.

While the foregoing is true initially, and explains incubation periods of the experiments upon Manson, CHART OF CASE I.



Warren, &c., the subsequent periods of latency after a first fever cannot be fairly considered on the evidence of isolated prolonged intervals alone. It is necessary also, and perhaps mainly, to consider the ordinary conditions under which the parasite remains "latent," as far as clinical or symptomatic evidence of its presence is considered. This is the most imits presence is considered. portant point to consider.

In cases untreated by quinine symptoms may increase, remain constant, or decrease. In such cases where blood examinations are made frequently it will be observed that similarly and correspondingly the parasites may become more numerous, remain in about the same numbers, or decrease in number. "During the first observed cycle there was an average of 500 parasites; during the second cycle an average of 446 per c.mm.; during the third an average of 627; and the fourth cycle, 302 per c.mm." TROPICAL MEDICINE, p. 110, April 1st, 1901.)

History.—L. A., aged 28, seaman. His last voyage, February, 1901, was to Rosario, where he had several Was admitted to Seamen's Hospital, with fever, April 29th. Other than purges, rest and diet, he had no treatment at that time; the fever ceased the next day and he continued free for a week. Blood examination showed a double tertian infection and many parasites were seen daily. On being sent out for a walk the fever returned.

Appended is a chart of his fever, from which is seen that, after spontaneous decline of his fever, the parasites remained below fever level for a week. See also case, Journal of Tropical Medicine, p. 178, June 1st, 1901, where the "special points of interest were:—(1) the absence of fever; (2) the presence of well-marked tertian parasites in considerable numbers; and their disappearance without

administration of quinine.")

If the parasites, as in the second case, or, as is common in a double infection, remain fairly constant at a low level no acute symptoms will manifest themselves, though organic changes, e.g., splenic enlargement, may occur. It is an old observation that chronic splenic enlargement may, and often does, take place in persons who suffer little from acute attacks of fever. It is quite common also to find huge spleens in children of Europeans who have been brought up in the tropics, and yet such have had very little fever.

Case II.—M. P. Mc.I., Seamen's Hospital, May 23rd, 1901, aged 30, had two attacks of jungle fever in 1890, and three years after another attack. In India five years; then East Africa two years-no fever; then West Africa-had one attack of fever on board; was fifteen months in Lagos, and no fever; was six months in Borneo-had no fever there. Temperature Spleen enlarged; extends almost to umnormal. bilicus and within two inches of the crest of the

ilium. No malarial parasites.

This period of latency then is only one of clinical latency; the parasites are not "latent"; they are destroyed at the same rate, or approximately so, as they are produced; the "birth and death-rates" are about equal, the population sparse and consequently does not increase. Pushing the matter further, it is unlikely that parasites would be found in an ordinary examination if they were only present in the proportion of 1 in 1,000 leucocytes or 7 per c.mm. of blood,<sup>1</sup>

<sup>1</sup> It is even hard to find them when only 35 to 40 per c.mm.

and yet this number would correspond in a person of average weight to:

Body weight of 65 Kilos.

× 1,000,000 c.mm. × 7 = 35,000 parasites.

The question naturally arises whether this is the only manner in which "latency" occurs. The suggestion of a latent form of parasite has been frequently made, but no proof has been offered. The karyochromatophilic granules, or primitive forms of Plehn, "Plehn's bodies," are plainly degeneration forms of red discs; so evident is this that no one has thought it worth while to refute his theory about them. By some, at one time, the gamete form was considered to be a possible latent form. With our present knowledge of the sexual nature of the gamete this supposition can be excluded.

It has also been suggested that perhaps in bone marrow or elsewhere a few of the parasites may continue to sporulate and pass through the entire asexual cycle without appearing in the peripheral blood. This supposition does not in reality throw any further light on the question. It may occur, and the peculiar aching of the bones so common before malarial attacks perhaps supports the view; but the apparent absence of parasites in peripheral blood is just as easily explained on the supposition of the number

present being small.

The next question that arises is the length of the period during which asexual reproduction of the parasites can be continued without fresh introduction of parasites invigorated by being sexually repro-Nuttall, of Cambridge University, has said of this: "Since the publication of Maupus' remarkable works we have become aware that, with all these protozoa, this faculty of non-sexual multiplication becomes exhausted in the long run, and the species would become extinct did not sexual reproduction intervene" (Journal of Tropical Medicine, 1900). Under favourable circumstances the period may be a prolonged one, but not interminable. The sum of the matter, in malarial cases of the tropics in England, is, that the parasites are latent in the body till they die down to extinction, because asexual reproduction is finite in about three years in quartan, two years in malignant tertian, and tertian in between these.

Clinically we have abundant evidence of repetition of asexual cycles for weeks (Journal of Tropical Medicine, pp. 178, 210, 1901; and the case L. A., previously given). In untreated cases, after a time the number of parasites falls (cf. case L. A., chart), but the fall may be slow and the decrease in number arrested by any change in the condition of the host, as exposure to cold, fatigue, excess, atony, illness, &c.,

and replaced by an increase.

Even without any such obvious condition there is a period when the parasites again become numerous, again diminish in number, and again increase. The observations actually reported on the number of parasites are too limited to be of much value, but of clinical evidence we have abundance (cf. case L. A., and others already referred to) that an attack of fever naturally subsides; that there is an interval of apyrexia, stated by Koch to be usually twelve days, but perhaps most commonly

from two to four weeks, and often up to three months, during which time there are no symptoms; and that after this period there is another pyrexial period, followed again by the apprexial or latent period.

It is noticed also that with prolonged residence in a malarial country the period of apyrexia in any given case tends to become longer, and that whilst in the first two or three years the periods of apyrexia are two weeks or a month, after five or six years' residence they are often six months, or even more, and also the actual pyrexial attacks are less severe; and the most severe attacks of all, those with coma, only occur in highly malarial districts in the earlier periods of residence.

The explanation of the period (always lengthening) between two attacks of fever, which fever is frequent at first, then less frequent, is as follows: Each attack confers a temporary immunity; this is lost after the increasing periods mentioned, and the person regains immunity after the parasites have been killed down. There is no absolute limit to latency while a person is subject to reinfection (in a non-malarial place it is definite and terminable in about three years), but there is a strong tendency for the infection to wear out. The interval is variable; short in first months, then longer; and after a certain time it is very long and fever infrequent.

Thus in a newly arrived person in the tropics, and for the first time infected, there is less latency of the parasite, and little immunity from fever later on; after years there is greater latency of parasite, and much immunity from effects of the parasites and malarial fever, which is only lit up at longer intervals. Still later in life there may be no parasites in the blood and immunity is reached, which some people do acquire in the Roman Campagna in spite of reinfection, which is harmless to them. This is seen also in bird malaria, where the old birds get immunity like man.

All this indicates an adaptation of the person to his parasites so that a limited number only will be tolerated, but that these up to a low limit will not give rise to sufficient reaction to cause their complete destruction.

It will be seen from the above that it is conceivable that the period of latency is a very indefinite one. It is only terminated by the complete destruction of the parasites.

The causes that lead to their destruction are unknown, but seem to be more active with numerous parasites, and diminish in activity when the parasites become very few, so that complete destructive agencies are maintained with parasites at a low level.

The clinical evidence of duration is in accord with the above. Recurrences of fever when removed from all possible sources of infection are very common for three months; are still common up to six months; but become rarer after that period. Up to a year, however, they cannot be considered as exceptional. In illustration one may quote the cases of Manson and Warren. Dr. Daniels had fever after twelve months' interval from the previous one, or ten months counting from last possible reinfection. It is two years since my last fever in Zanzibar. I have had three fevers during the three years of my absence from the Congo.

There is a large amount of negative evidence of

recurrence of fever over two years.

Certain favourable and most important deductions may be drawn from latency when free from possible reinfection. If a person in England has had no fever during the first two months of return it is a very favourable sign, and if five months have elapsed then the possibility of bilious hæmaturic fever is remote.

The existence of crescents may be reckoned in

weeks, after which they disappear.

The action of quinine upon latency is remarkable. A suitable dose kills off about 99 per cent. of the spores at sporulation, i.e., reduces them to  $\frac{1}{100}$ th of original number, after which the body, probably by the large mononuclear leucocytes, keeps them at a low level till the fever is relit or continues the progress to extinction. More probably, and more reasonably expressed, quinine helps the large mononuclears to assert their acquired inhibitory power to keep the parasites at a low level tolerated by the body. This is done by phagocytosis. If a dose of quinine kills off 99 per cent., a larger dose might be expected to kill them quite off; generally it does not, for while it is a specific poison to the spores, it very seldom kills them off entirely. A certain number remain unkilled and latent. Dr. Manson thinks that it acts upon something, which in its turn acts upon the parasites; quinine helps to fight the parasites.

If the spontaneous cure of malarial fever and their being kept low and comparatively harmless is effected by the large mononuclears, it may find a possible elucidation in the analogous process observed in relapsing fever (Pasteur Institute Annales, August, 1901). Here the natural cure is brought about through the phagocytic action of the polymorphonuclear leucocytes. These kill off the spirochetes when the fever is highest by a corresponding and simultaneous great increase of themselves (18,000 leucocytes to c.mm.) As in malarial fever the large mononuclears only are increased from the normal 8 per cent. to 30, 50, or 60 per cent., and the polymorphonuclears diminished, probably here we may find the rationale of the parasite's disappearance by phagocytic action of the large mononuclears. This action is often ineffective to utterly destroy them, with or without quinine,

resulting in a latency of the parasite.

Quinine then, taken in fever or prophylactically, will help to keep the parasites at a low level, and therefore comparatively harmless. Plehn in his "Weiteres über Malaria," maintains that at Cameroons, by giving half a gramme every five days he has increased the apyrexial periods, or latency, to about twelve to fourteen months on an average; increased the possible length of service of officials, and lessened the frequency, intensity and death-rate of fever; and furthermore diminished in consequence the tendency to black-

water fever.

One-third of a grain given thrice daily in malarial fever of a suitable subject will keep the parasites at a low level. On the other hand I have seen cases where one drachm a day did not reduce the parasites or save the patients. Probably in such cases there was an unhealthy phagocytosis. A great increase of immature ineffective large mononuclears, having no phagocytic action, returning home empty as it were, would

account for the ineffectiveness of quinine in these cases.

That the use of quinine tends to increase the duration of latency or apprexial periods, keeping the parasites low, should be most important in practice (JOURNAL OF THE TROPICAL MEDICINE, p. 179, June, 1901), and completely rectify the idea of only giving the drug to meet and kill off the spores at the moment of their liberation during the fever.

Case III.—H. R., in Congolese Africa more than twenty years. Habit, through all these years 3 to 5 grains quinine daily prophylactically; had good health while so doing and never bilious hæmaturic fever. Returned to the Congo in 1901 after two years at home. Ceased the preventive use of quinine with the idea that the drug was only effective at moment of parasite's sporulation. Had his first attack of black-water fever almost immediately. Now returned to old habit.

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# Current Witerature.

TROPICAL ULCER AND ITS TREATMENT BY HOT WATER.—Roux speaks of an ulcer common to the natives of the west coast of Madagascar, and its treatment by hot water. It does not often attack Europeans, since their conditions of life are so different from those of the natives. It is found chiefly in the labourers-those subject to wounds and infections. It frequently has its origin in an injury caused by small thorns which are produced by certain kinds of native herbs. These penetrate the skin, and an abscess eventually forms and becomes the seat of various infections. This ulcer is very frequent in its occurrence and shows great resistance to the ordinary remedies. Excellent success has attended the use of hot water of 55° to 60° C. (131° to 140° F.). The water is boiled for fully

fifteen minutes, and is then cooled down to about 55° C. The water is applied first by squeezing it out of a pad on to the ulcer, care being taken to protect the neighbouring parts. A pad soaked in the water is next applied and allowed to remain some minutes on the ulcer. Next a compress of gauze wet in the hot water is laid on the ulcer previously covered with vaseline; over this a pad of absorbent cotton is fixed by a bandage. The dressing is renewed every day and the limb is kept at rest. The cure is speedy; the suppuration ceases, and cicatrisation is rapid. When the cure proceeds more slowly, and the presence of syphilis is suspected, iodide of potassium is administered. Ulcers 7 cm. in diameter have been healed in three or four weeks. The writer states that he has now employed this treatment for two years and has discarded all other methods. It is probable that the hot water acts directly on the micro-organisms in the wound, attenuating their virulence, and on the general organism, increasing its resistance to the action of the microbes. As soon as the application is made, the base of the ulcer reddens, showing a reflex vasodilator action very favourable to phagocytosis. The cells themselves are reflexly excited, their vitality is increased, and they multiply.—Le Caducée.

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# Original Communications.

THE PART PLAYED BY THE FLEAS OF RATS AND MICE IN THE TRANSMISSION OF BUBONIC PLAGUE.

A Critical Note.

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THE part played by certain insects and arachnides in the transmission of various parasitic diseases of man and beast is well known. It will suffice to recall the important rôle the mosquito plays in the transmission of the malaria of human beings and birds, of yellow fever, and of the filariasis of men and dogs; the rôle of the Tsé-tsé fly in the transmission of naganà; of ticks in the transmission of malaria of cattle and dogs; and the part played by flies and other dipteræ in the transmission of anthrax, &c.

These facts probably induced Dr. Simond<sup>1</sup> to open up the question of the transmission of bubonic plague to man from rats and mice through the instrumentality of the fleas of these animals.

Ogata<sup>2</sup> had previously, in 1897, conveyed plague to mice by inoculating them with triturated fleas collected from plague-infected rats. M. Simond confirmed the presence of a bacillus, morphologically similar to the plague bacillus, in the fleas taken from rats suffering from plague. Of three mice, inoculated with these fleas pounded up in a few drops of water, one only succumbed to bubonic plague.

M. Simond, besides, observed the death of one rat and one mouse placed in a cage with a rat that had died of plague, to which he had previously added fleas from a cat (!); whereas of seven rats placed in a cage

with a rat that had died of plague, but which exhibited no fleas, none of the seven showed symptoms of

In consequence of these observations, M. Simond's attention was arrested by initial bullæ observed on persons suffering from plague (one case in every twenty), and in which he found the plague bacillus.

According to M. Simond these blebs were due to the bites of fleas of rats and mice. The mode of infection, according to M. Simond, is supposed to be as follows: "The sting (sic!) steeped with blood cannot for long maintain its power of infection. The flea in these cases would be useless except at the moment when it leaves the plague-stricken animal. But it is feasible to suppose that during suction the flea deposits its dejecta, consisting of a tiny drop of digested blood, on the place where it is perched. In cases where this fluid is a culture of plague bacilli it is feasible to conjecture that it may infect the person through the perforation made by the sting.

From these facts M. Simond draws the following conclusions: "While recognising that this hypothesis has not the value of a demonstrated fact, we are of belief that the various forms of 'spontaneous' plague in men and animals generally take place by one single mode of infection-intracutaneous parasitic inocula-

M. Simond's work made some sensation, but instead of being enquired into, his views were accepted as they stood, and above all by the French, who had no hesitation in affirming that the transmission of plague from rats and mice to man took place through the intermediation of fleas, and that this was the most important means of transmission of the disease. Before attacking M. Simond's theory, we will first consider what publications have appeared subsequently, having for their object the support of the theory of the transmission of plague by fleas.

There is, first of all, an article by M. Loir, Director of the Pasteur Institute at Tunis.8 He commences as

Annales Pasteur, 1898, No. 10, p. 625.
 Centralbl. für Bakt., 1897, xxi., Nos. 20, 21, p. 769.

<sup>&</sup>lt;sup>3</sup> Revue Scientifique, 1900, No. 13, March, p. 395

follows: "It has now been demonstrated that the flea is the principal intermediary of the plague between the rat and man.

A curious affirmation, when M. Simond himself had declared that his theory had not the value of a demonstrated fact! Starting with such premises it is easy to arrive at conclusions favourable to M. Simond's theory.

In discussing this affirmation M. Loir explains why a certain immunity as regards plague is noticed in persons working with oil. The presence of oil on the skin drives the fleas away. This is how M. Loir and his assistants made their experiments: "We shut up a rat in a cage and afterwards placed it for twenty-four hours in a house in Tunis in which we knew by experience that fleas swarmed, inasmuch as, during a medical visit to a street porter living in this house, I had removed thirty-seven fleas from my garments in the evening. At the end of twenty-four hours the rat was swarming with these insects. placed two small cages within this cage, one containing an ordinary rat, the other a rat previously dipped in olive oil; we then killed the first rat and left its body in the large cage at an equal distance from the two small cages. On the following day, of course, not a single flea was to be seen on the dead body. rat that had been placed in the first of the small cages was covered with fleas, but the rat dipped in olive oil had not a single one." M. Loir concludes from this experiment that it is perhaps this distaste of the rats for oil to which the immunity of all workers in oil-factories is due, a circumstance that has been remarked in all epidemics of plague.

Another work supporting M. Simond's views is by Dr. Ashburton Thompson, Government medical officer at Sydney. During the epidemic in this city Dr. Thompson observed the blebs described by Simond in six cases; a small proportion, he observes, in relation to the great number of cases examined. In one of these pustules he found a bacillus, similar to B. pestis, in small numbers. Dr. Thompson then examined fleas taken from plague rats, and in one flea he found B. pestis, which proved destructive to guinea pigs. Of nine specimens of fleas he found, on the rats he had examined to find out the species, two were P. serraticeps and the others P. fasciatus. In consequence of these facts Dr. Thompson thinks he is entitled to conclude that the transmission of plague from rats and mice by the intermediation of fleas must be very frequent.

During the same epidemic Dr. Tidswell,2 Bacteriologist to the city of Sydney, also pronounced favourably in support of M. Simond's theory. He gave plague to rats by inoculating triturated fleas taken from plague rats; and he observed that at the time the quays of the city were covered by dead rats, that the fleas swarmed into the streets to such a degree that the labourers were obliged to tie the bottom of their trousers with string round their feet, in order to protect themselves from the onslaughts of these vermin.

Let us now undertake a critical study of these articles.

Dr. Nuttall<sup>3</sup> is the first to throw doubts on M. Simond's affirmations, for he observed that the bacteria passing through the body of fleas and other insects often succumbed. In conclusion he observes: "What we want in this respect is more facts and fewer opinions, and the facts can only be gathered by further experimental research."

Without having any knowledge of the work of Dr. Nuttall, which the author only sent to me after my article had been published, I also submitted a study which was critical and, to a certain degree, experimental on M. Simond's theory, and it is to a great degree the contents of these investigations which, in addition to the new facts and the new criticisms, I shall give here.

In the first place the initial blebs, of which M. Simond has spoken as a point of entry by the bites of fleas, has been observed by him in too restricted a number to convince us that this mode of infection is the most frequent.

This rarity forcibly struck Dr. Thompson, who notes how small the proportion of cases of blebs are in comparison to the cases examined, and of the six cases examined only one contained B. pestis. It is true that M. Simond, to explain the affair, evolves the theory that if the flea inoculates a very active virus the bleb will not be produced, though the infection is conveyed. But as M. Simond admits that the infection does not take place by direct inoculation, but by means of the bacilli passed through the digestive tract of the fleas, and as, according to the experience of Nuttall, these bacilli in most cases are attenuated, if not dead, it appears to me that if the indicated mode of infection were frequent blebs also should be much more common.

M. Simond, in expounding his theory, has taken no trouble to find out if the fleas that live on rats and mice are of the same species as those that live on man. This is what he says: "The flea commonly met with on the wall rat (India) is of medium size, of a greyish colour, with a spot the colour of dregs of wine on the lateral aspect of the abdomen; this spot is nothing but the stomach filled with blood seen in consequence of transparency.

"We are not aware if this flea is a different variety from the ordinary fleas of men and domestic animals (sic). At the same time we have convinced ourselves experimentally that, transmitted to persons or dogs, they immediately attack them."

Such a confusion of the forty-eight species of common fleas is not adapted to inspire great confidence in the author's experience. Indeed, how can we positively assert that the flea in question immediately bites man and the dog if we do not even understand what flea is in question; and a little time after, to make confusion more confounded, M. Simond records experiments made with fleas taken from the cat

A deplorable analogous confusion is exhibited in

<sup>&</sup>lt;sup>1</sup> Journal of Hygiene, vol. i., 1901, p. 153. <sup>2</sup> Journal of the Sanitary Institute, 1901, p. 509-578; Résumé des la Rev. d'Hyg., 1901, p. 553.

<sup>3 &</sup>quot;On the Rôle of Insects, Arachnides and Myriapods as Carriers in the Spread of Bacterial and Parasitic Diseases of Man and Animals." Johns Hopkins Reports, vol. viii., 1899.

4 Centralbl. für Bakt., 1900, xxvii., No. 1, p. 1, and xxviii.,

No. 4, p. 842,

M. Loir's work, who classes all the fleas together and tries to show that there is only one species. The first question to settle is the zoology of the fleas, and then discuss the question whether the specimens

found on rats and mice can attack man.

I set to work to ascertain the nature of these parasites and find that the fleas met with on rats and mice under normal circumstances are Typhlopsylla musculi and Pulex fasciatus. The first mention made in literature, and this after the appearance of my work, is by Dr. Thompson, who asserts that among fleas collected on rats there were two from which he obtained P. serraticeps. This specimen is a flea of the carnivora and is very frequent on dogs and cats. It sometimes passes on to man, and Railliet as well as myself have also found it on the rabbit.

In order to confirm which species besides Pulex irritans bite man, this being man's particular flea, I made some experiments on myself, and when permitted on other persons. Here are the results:—

Typhlopsylla musculi.—In one case in which I was invaded by numerous fleas of this species coming from a white mouse I did not receive a single bite and all the fleas quickly left me. Some of these fleas, placed expressly on my body and left free or under glass bells, never bit me although fasting.

Pulex fasciatus.—What I have reported of T.

musculi stands good for this species.

P. serraticeps.—This species, as is known to numerous observers, bites man. I have myself found it on human beings. Placed on my body under a glass bell it immediately bit me.

P. goniocephalus.—This specimen, conveyed from

the rabbit to my body, did not bite me.

P. avium.—A variety which, according to M. Lucet may bite man, being placed on the body of a colleague and myself caused no wound although it had been kept fasting a long time. I may remark that the specimen employed for this experiment emanated from a Chelidon urbica.

P. erinacei.—I was invaded by numerous fleas of this species. I placed some hundreds under a glass bell on to my body. Although I had not felt any bites from those that had been free on my body, yet those under the glass bell bit me slightly. They remained only a short time on my body.

The experiments quoted are not of absolute value as they were mostly made on myself and not on several persons, but their value is increased by the fact that I was bitten by different species, such as

P. irritans, P. serraticeps and P. erinacei.

From these experiments it appears that P. fasciatus and T. musculi do not seem to bite man. remains P. serraticeps, which Thompson affirms he twice gathered off rats. But P. serraticeps must be very uncommon on rats. I have examined numerous rats without ever finding a specimen. Nobody, with the exception of Dr. Thompson, has quoted it as being found on this animal. On rabbits, where it was found by M. Railliet and myself, it is scarce, and M. Railliet's efforts to acclimatise this species on a rabbit by introducing a number into the hutch were unsuccessful. Dr. Thompson's observation therefore palpably relates to a rare case, an accidental case, and we cannot rely on this observa-

tion for the purpose of considering this flea as the ordinary medium for transmitting plague from rats

Dr. Tidswell, as M. Vallin admits, shows that he has a certain partiality for this almost exclusive mode of infection by means of the bites of fleas, gives absolutely no facts to support his theory. failed to give plague to rats placed in cages separated by large-holed lattice work from other cages in which there were plague-stricken rats, or even by placing healthy rats in dirty cages where other rats had died from plague. Quite recently Kolle<sup>1</sup> has also asserted that he could not succeed in giving plague to healthy rats placed in cages containing numerous fleas from off plague-infected rats, although he could positively affirm the fact that these fleas went on to the rats in the cages. He concludes that if the transmission of plague from rat to rat by means of flea-bites exists it has not been proved.

We know that Simond only had the death of one rat and one mouse placed in a cage with fleas from a cat originally taken from a plague rat. If transmission is so difficult from rat to rat, why, on the other hand, should it be so frequent from rats and mice to man, who is not as a general rule attacked

by mouse and rat fleas.

Dr. Tidswell tells us that the abundant fleas on the quays at Sydney, probably from dead rats, attacked men's legs. But these fleas were not examined to ascertain if they were mouse and rat fleas; we are not informed if they bit the men or not, and we are not told if these men, invaded in this fashion, were more attacked by plague than others. Concerning these matters M. Vallin, though in favour of M. Simond's theory, writes: "At the same time Dr. Tidswell has not furnished us with sufficient details concerning his experiences, and has not supported the numerous assertions in his work by proofs."

To all this I must add that neither the German Commission nor Mr. Schotelius in India, nor during the ep demics at Oporto, Glasgow, or Naples, has the transmisson of plague to man been traced to the fleas of rats and mice. In opposition also to the assertion that this mode of transmission is the most frequent and almost exclusive (even taking into account the great facility with which plague is transmitted to man by the Arctomys bobac, on which, as far as I know, there are no fleas), is the fact noted by Edington,3 that at the Cape the rats that died of plague did not succumb to bubonic plague, but to a disease due to a bacillus analagous to B. pestis, which is non-pathogenic to guinea-pigs and pathogenic to pigeons.

The facility also with which it is possible to arrest

an epidemic of plague where hygienic conditions are good, and isolation properly carried out, speaks against

this theory.

If M. Simond's hypothesis were correct, one might almost fold one's arms in consequence of the difficulty of preventing the diffusion of infected fleas, which, according to Tidswell, were met with in millions where rats had died of plague.

<sup>&</sup>lt;sup>1</sup> Zeitschrift f. Hyg. u. infect., xxxvi., p. 397. <sup>2</sup> Hyg. Rundsch., 1900. <sup>3</sup> Centralbl. fur. Bakt., xxix., No. 23, 1901, p. 889.

In conclusion, instead of asserting—as is too often the case—as an established fact that plague is transmitted to man by the bites of the fleas of rats and mice, and that this is the most frequent and important means of infection, it requires to be demonstrated, not only that the fleas pass from rats and mice to man, but from rat to rat.

The question can only be solved in one way, namely, by conveying to the bodies of human beings rats' and mice's fleas that have lived on plague rats. If this experiment is, as I believe, considered to be necessary, I place myself entirely at the disposal of the committee to undergo it.

ADDITIONAL NOTES ON MALARIAL FEVER IN ST. LUCIA; AN ANALYSIS OF 230 CASES.

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A FEW months ago Dr. G. C. Low and I sent a short note to the British Medical Journal, on the

prevalence of malaria in St. Lucia.

Since Dr. Low left St. Lucia to continue his researches in Barbados, British Guiana and St. Vincent, I have followed up the subject on similar lines. In all I have collected notes of some 230 cases of malarial infection representing about 400 blood examinations of patients selected from 2,433, who came to the Castries Dispensary with various complaints for medical advice and treatment. As I was working alone, and without Dr. Low's valuable assistance, and as the time at my disposal was limited, I was obliged to make a still more careful selection of cases for blood examination than in the first series. Only those who gave a definite history of fever, or who had febrile symptoms, or in whom I had reason to suspect malarial infection, were examined. No children who did not present symptoms of fever were examined for malarial parasites.

Most of the slides were examined wet as in the first series, but a certain proportion of dried and stained films were examined also, the stains used being borax-methylene blue or eosin and hæmatoxylin. The latter stain is especially useful when it is necessary to count the leucocytes in cases of suspected malarial fever where no parasites can be found. In these cases examination should be made both of wet films and of

dried and stained preparations of the blood.

I can confirm the observations of Drs. Stephens and Christophers as to the increase in the number of large mononucleated leucocytes being diagnostic of malarial fever. I consider this one of the most important points elicited by those at present engaged in the investigation of malaria. These leucocytes, the "large hyaline cells" of Kanthack and Sherrington, are the largest of all the leucocytes, and are easily recognised, being usually ovoid or irregularly spherical in shape with clear, non-granular protoplasm. They undergo active amœboid movements and are phagocytic. They are the leucocytes which become pigmented in malarial

fever. The only other diseases in which the proportion of large mononucleated or hyaline leucocytes is increased, are lymphosarcoma, the cachexia of malignant disease, and in terminal leucocytosis, and then only occasionally. In every case in which I have found malarial parasites and have made a numerical estimate of the different varieties of leucocytes this increase has been observed. Here are a couple of examples taken at random from my note book.

Case 229.—T. B., female, age 25, complains of fever every third day; five months pregnant. Blood examination shows quartan parasites and rosettes.

Large mononucle	ar leuc	ocytes		line nsition	al	19·37 12·11
Polynuclear	,,		Neu	trophi inophi	le	
Lymphocytes						25.42
· * * * * * * * * * * * * * * * * * * *						100:00

Case 383.—F. B., female, age 18. Pyrexia: indefinite symptoms. Blood examination shows malignant rings, pigmented leucocytes and crescents.

Large mononucle	ar leuc	ocytes	aline nsition	al	28.68 8.45
Polynuclear	,	,	itrophi		37·87 1·10
Lymphocytes	••		 ••		23.90
					100:00

Normal blood examined at the same time and stained in the same manner.

Large mononucleat	ed lev	cocytes	Hy	aline nsition	nal	3.89
Polynuclear	,	,	Net Eos	itroph inophi	ile	64·40 1·95
Lymphocytes		••				25.29
						100.00

I have had no opportunity of examining the blood in yellow fever but if it should turn out that there is no such increase of the large mononuclear leucocytes, then we have a valuable means of differential diagnosis between these two diseases, especially where quinine has been administered and so interfered with the

examination for malarial parasites.

The transitional forms are large mononucleated leucocytes intermediate between the hyaline and polynuclear leucocytes, with indented or kidney-shaped nuclei, which stain more deeply than the nuclei of the hyaline cells. They resemble sometimes the hyaline and sometimes the polynuclear cells, while they vary in size, so that it is often extremely difficult to decide whether some leucocytes should be classified with the small or large mononuclear forms. In the above examples all doubtful forms have been classified as transitional, and only hyaline cells, about which there could be no doubt, have been included under that head.

### THE PARASITES.

In 171, or 75 per cent. of the infected cases, malignant parasites were found. Thirty-six of these cases, 21 per cent. of the malignant infections, or about 16 per cent. of all the infected cases, had crescents in the blood, and were therefore sources of danger to their neighbours.

The most dangerous age appears to be the time of

<sup>1</sup> Published January 25th, 1902.

puberty and adolescence, for not only was the greatest proportion of malignant infections found among those from 10 to 20 years of age, but also the greatest number of crescent cases, and the most severe types of fever were met with in children near the age of

puberty and in young adults.

The malignant parasites met with are the ordinary unpigmented ring forms. Pigmented rings are not uncommon, but they are always accompanied by unpigmented forms. I have never seen them alone, and consider the pigmented malignant rings to be merely a further development of the ordinary unpigmented rings.

I cannot say that I have seen the unpigmented quotidian parasites, or Hamamaba immaculata of Grassi and Feletti, although I have seen minute rings in a few severe cases which I believe were only young

parasites.

In the course of my investigations I have been able to trace certain phases in the development of the One thing appears to be certain-it is always intracorpuscular while in the circulation; and in my opinion it only becomes extracorpuscular when it exflagellates and the flagellæ burst through the limiting membrane of the corpuscle in the case of the microgametocytes, or, in the case of the macrogametes, when the small globular bodies (polar bodies) make their appearance on the periphery of the non-

flagellating spheres.

When a parasite (A) is about to become a crescent, instead of breaking up into spores its protoplasm appears to become encapsuled within the corpuscle. The pigment collects in the centre of the parasite, which has now become spindle-shaped (B). young crescent grows the ends of the spindle touch the limiting membrane of the corpuscle (c), and as it is prevented by this limiting membrane from growing longer as a spindle, it is bent in the form of a crescent (D). Finally, the pressure of the two ends of the imprisoned spindle (which is very elastic) on the limiting membrane of the corpuscle causes it to stretch and give way, but not to rupture. The ends of the crescent now appear outside the circumference of the corpuscle (E), still covered, however, by a thinner portion of its capsule—just as when one tries to push the end of the finger through a thin sheet of india-rubber which has been put on the stretch. The capsule of the corpuscle has not, however, been completely overcome, for it is still sufficiently strong to prevent the crescent (F) from straightening out into a spindle again until it leaves the circulation and becomes subject to external influences.

Sometimes the crescent is unable to push its way through the capsule of the corpuscle and curls up within it (G). These cases are rare. I have seen only one, and in this the patient had taken quinine three days before. Here it is possible that the quinine may have had some inhibiting influence on the growth of the crescent, the result being a degenerate, or rather

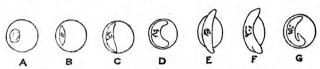
immature form.

I see no reason for adopting the suggestion of Mannaberg, viz.: that the crescent is the result of the conjugation of two ordinary parasites in a doubly infected blood corpuscle. It would be just as reasonable to suppose that the tertian and quartan gametes

are derived from the conjugation of two tertian or quartan parasites in the same corpuscle.

Benign tertian and quartan infections are comparatively rare and do not call for any particular Quartan infections are seldom met with and are the rarest of all forms of malarial fever seen in this colony.

Double infections, i.e., benign tertian and malignant parasites in the same person, were found in eight cases, or about 3.5 per cent. of the whole. In one of these both the benign tertian and malignant parasites were sporulating at the same time and I had an opportunity of comparing the two forms of "rosettes" in the of comparing the two forms of "rosettes" same field of the microscope.



A, Malignant parasite; B, the same, having become spindle-shaped; c and D, young crescents within the corpuscle; E, the ends of the crescent pushing through the limiting membrane of the corpuscle; F, the crescent body as usually seen; G, crescent curled up within the corpuscle (from a case that had had quinine three days before).

Pigmented leucocytes alone were found in twenty cases, or 10.87 per cent. This large proportion is, no doubt, due to the fact that I was sometimes pressed for time, and made a hurried diagnosis of malarial fever as soon as I had found evidence of infection either pigmented leucocytes or some form or other of the malarial parasite—without making a complete examination of the slide. A more prolonged search in a number of these cases would probably have resulted in finding parasites as well.

		Ao	ES		
	Under 2	2-9	10—20	21 and over	TOTAL
Malignant parasites .	. 14 50 %	44 57·89 %	44 63·78%	33 57 90 %	135 58·69%
Crescents	5	10 13·16 %	13	8	36
Benign tertian parasite	s 2 7·14 %	8 10·53 %	5·80 %	6 10·53%	20 8·70 %
Quartan parasites .	. 0	5·26 %	1.45%	1 1·75 %	6 2·61 %
Double infections .	· 2 7·14 %	2 2·63 %	2 2·90 %	2 3·51 %	8 3·48°/
Pigmented leucocytes.	5	8 10·53 %	5	7	25
Total infected .	. 28	76	69	57	230

The pigmented leucocytes are easily recognised as large ovoid or irregularly shaped cells, the clear protoplasm of which is dotted with coarse or fine granules of intensely black pigment. These granules, in doubtful cases, may perhaps serve as a guide to the nature of the infection. I have observed that when the granules are coarse and large the parasite, when found, is malignant, and that when they are fine the parasite is of the benign tertian or quartan type. This may be only a coincidence and needs further investigation before it can be accepted as an estab-

The number of mild infections seen here is so small that observations would have to be continued for many months before this could be confirmed or refuted.

The severity of the symptoms has no apparent relation to the number or nature of the parasites found in the peripheral blood. I have seen a patient extremely anæmic, with high temperature, and apparently very ill, but could find only quartan parasites in the blood. This case was complicated by intestinal worms, which were probably the chief cause of the anæmia. But in other cases in which the patients were really very ill indeed (one or two were moribund) it was only after a prolonged search that I was able to discover perhaps one or two malignant rings or a pigmented leucocyte. I do not refer to cases in which the patient has had quinine, for then it is always difficult, often impossible, to find parasites at all. On the other hand, I have seen the blood of patients who complained of nothing more than a slight feeling of malaise, swarming with malignant parasites, or even with crescents. One woman who came to me said that she had not had fever for more than a week and that she felt quite well but wanted some medicine to give her strength. examined her blood with the microscope, however, I found from one to three crescents in nearly every field. Such cases are of course unusual, and when numerous parasites are found in the blood the patient is generally fairly ill.

do not find very young children more susceptible to malarial fever than others, for out of a total of over fifty children under 2 years of age, all of whom presented some symptoms of fever, only twenty-eight, or about half, were infected. I have not yet been able to find the parasite in children who had not some

febrile symptoms

Natives of the place do appear to acquire some degree of immunity as age advances; but this immunity is not very great, nor is it constant, for I have seen very severe infections with crescents in old people over 60 years of age. Strangers from other islands, especially from Barbados and Montserrat, appear to be more susceptible to the malarial infection than natives of St. Lucia. Dr. Low has been unable to find Anopheles in Barbados, where all the cases of malaria

are, as far as I know, imported.

This second series of cases bears out what we stated in our former paper, that in St. Lucia the most unhealthy season of the year for malaria is during the months of January, February, and March. In the first series of cases, out of 1,061 people seen between January 14th and April 4th, suffering from all kinds of diseases and injuries, 137, or 12.91 per cent., were malarial infections. In the second series, embracing the period between the middle of April and the end of August, 2,433 people were seen and only 230, or 9.45 per cent., were infected. I do not believe that in either series we missed a dozen cases of malarial infection from neglecting to examine blood films. It is to be regretted that these cases could not be followed to their termination, but as most of the patients came to the dispensary once only, seldom twice or oftener, and then disappeared, this was impossible.

HINTS ON THE PREPARATION AND EXAMINATION OF BLOOD-FILMS FOR MALARIAL PARASITES.

I generally see my patients at the dispensary with my microscope in a convenient position on the table beside me. Close at hand are a few pieces of old cloth about six inches square, a few glass slides and cover-glasses, a needle or other instrument for puncturing the skin (I use a hare-lip pin with the point ground very sharp), a small, wide-mouthed bottle of spirit, and a small basin of water. The latter should be placed as far away from the microscope as possible. When a patient comes in whom I think it necessary to make an examination of the blood, I clean a slide and cover-glass with a piece of the old cloth and a drop of spirit. Then I sterilise the needle and clean the patient's finger-tip or the lobe of the ear with spirit and make the necessary puncture. I have observed that the smaller the droplet of blood taken up on the cover-glass the better the film. It is a mistake to take too large a drop. It is better, and saves time in the end, to wipe away the blood over and over again until one gets a droplet of the proper size. I do not ring the preparation with vaseline, as a rule, unless I wish to make a more extensive study When a convenient field is found with the low power objective, the nose-piece is revolved and the highest power used. If one has no revolving nosepiece a proper field can be quickly found by focussing the extreme edge of the film with the high power objective, and then drawing the slide slowly across the stage in such a manner that the centre of the film passes under the objective. In this way the different tones of the film come into view and can be examined. Care must be taken to focus the extreme edge of the film, for the zone of free hæmoglobin is often perfectly homogeneous, and should one attempt to focus that, the high power objective may be brought down upon the cover-glass if one is not very careful.

If parasites are not seen in the first two or three fields I usually go rapidly over the whole slide, looking out for pigmented leucocytes or crescents. These are readily recognised by their large size and black pigment, and, in the case of crescents, by their very definite shape. Of course, if a parasite should appear in the field I stop to identify it and make any observations that may be necessary. The amœboid movements of the malignant parasites in freshly drawn blood are so very active that it is often impossible to see them until they become quiescent. By the time one has gone over the whole slide and determined the presence or absence of pigmented leucocytes or crescents, these movements will have slowed down and the parasites, if present, will have become visible. Malarial parasites have a higher specific gravity than hæmoglobin, and, when at rest, will be found by focussing the lower surface of the corpuscles in which

they are.

When the examination of the slide is finished I drop it into the basin of water and the nurse cleans it and the cover-glass, while I make the necessary entry in my note-book and prescribe for the patient.

The usual fallacies of mistaking vacuoles for parasites, dirt for pigment, &c., can best be avoided by knowing and recognising every object that appears in the field of the microscope. Bacteria are nearly always actively motile, and are usually too small to be mistaken for malarial parasites. Sometimes a blood-plate will rest upon a corpuscle and simulate a parasite, but it does not exhibit amæboid movements, it is nearly always crenated, and can be made to move away from the corpuscle by tapping on the cover-glass with a needle. This tapping on the cover-glass is of use also as a means of making a crescent come out of its hiding-place when in the zone of heaped-up corpuscles. Occasionally something black is seen among the corpuscles, but these are so close together that it is difficult to see just what it is until the corpuscles are set in motion, and the black object is then seen to be the central pigment mass of a crescent.

Films that are to be dried and stained can be most conveniently and rapidly made by spreading out a drop of blood on a slide with a needle in the manner recommended by Christophers and Stephens. It is not always easy, however, to regulate the width of the film. It is often too wide and its edges lie outside the area under the cover-glass. This is a disadvantage when leucocytes have to be counted, as they have a way of getting to the edges and ends of the film, and consequently, if the film should be too wide a large proportion of the leucocytes would not be under the cover-glass. This disadvantage can, to a certain extent, be overcome by practice, but not always. When the patient is very anæmic, and the blood thin and watery, it is often surprising to note how quickly a drop of blood runs along the needle to the very edges of the slide. In these cases the tissue paper method is the best, as the width of the film can be regulated by the width of the strip of paper.

As cover-glasses soon devitrify in this climate it is necessary to adopt some means of preserving them. I put them into a wide-mouthed bottle of ether as soon as received from the optician. This removes all grease and apparently preserves them as well as anything else and they are always ready for use.

## SPIRILLUM FEVER (RELAPSING OR FAMINE FÈVER).

By CUTHBERT CHRISTY, M.B., C.M.Edin.

THE following notes on an epidemic of spirillum fever in India may be of interest.

In September, 1900, while I was stationed at Ahmednagar, perhaps the healthiest and nicest station in the Bombay Presidency, one of the circle inspectors reported through the Mamlatdar, Taluka Nugar, that an unusual amount of sickness was prevalent in the small village of Jeur, about ten miles to the north. This village, I was told, had suffered from plague during the previous year (1899). As Acting Civil Surgeon of the district I considered it my duty, therefore, to at once make a visit of inspection, the District Medical Officer being in another part of the

On arriving at the village, I found it to be of the typical Indian agricultural sort—a cluster of flatroofed houses, built of sun-dried mud, many of them only ventilated and lighted by a low, dog-kennel-like doorway. Its population was judged to be about a

I first proceeded to make an inspection of the sanitary condition of the place, and found it on the whole cleaner than many similar places I had visited. An Indian village of this type has one thing in common with Irish villages—the close association of the inhabitants with their domestic and other animals. In this case, instead of pigs, cows and buffaloes, old and young, blocked up the narrow passages, or were stabled almost in the living rooms. I continually had to climb over heaps of stable refuse before reaching

the doorways.

A police officer, who had arrived at the village before me, had prepared a list of persons who were sick, so after my inspection of the surroundings I commenced to visit these one by one. In almost every instance I found persons suffering from "fever," or the results of it. After having examined a number of the cases it was evident that it was not malaria, but spirillum fever that I had to deal with. Jaundice was frequent, whilst injected and ecchymosed conjunctivæ were prominent features. Histories of pains in the joints, severe fever with more or less weekly intermissions, and the occurrence of many cases of parotitis, strengthened the diagnosis. Only in two or three cases, at the time undergoing a relapse, did I find an enlarged spleen; but slight enlargement of the liver, with tenderness over that region, was common. There were nowhere any signs of plague. The largest proportion of the cases seen were males, but probably the females had not been notified in the same proportion as the males.

In studying the list afterwards I concluded that the greater number of the other diseases met with in the course of my inspection were in all probability the results of spirillum fever, for example, "mumps, bronchitis and chest trouble generally, acute nephritis in three children, complaints of "rheumatism," &c. Only in one instance did I find what might have been

a case of malaria.

Apparently distinct centres of infection were to be noticed, almost all the occupants of certain blocks of houses were suffering from the "fever" in one stage

or another, or the results of it.

After my inspection, having done my utmost to ingratiate myself with these people, I tried to persuade some of the cases to allow me to take some blood smears. As I expected, all refused. A period of commotion and excitement began amongst the assembled multitude, and I soon saw that I had fallen in their Amongst superstitious people of this estimation. sort, particularly in some isolated rural districts, it is imperative that the official should raise no suspicion of inoculation or like procedure. Inoculation under these circumstances can only be carried out when the community is influenced by elders or natives sufficiently educated to appreciate its benefits, and who set the example by being inoculated themselves. Serious riots, in which murder has played a part. have resulted in India from attempts to enforce inoculation.

The taking of blood slides is naturally looked upon as some form of inoculation, and I have on several occasions found myself in situations which threatened to become serious owing to my attempts to procure them. However, in this case I was determined to get my slides. After much talk and explanation, and having demonstrated my process upon my own finger, and upon the ear of a sepoy, they at last began to give in. I then made an offer of Rs. 2, and in the end I was allowed to operate upon a boy about 20 years of age, living in one of the infected blocks, whose temperature was 103°, and whose appearance was typical of most of the other cases. From him I procured two smears, and, as no one else was willing to offer himself, I made the best of my way back to Ahmednagar, glad to be out of the village, with its dirt and sickness, and away from the evil looks of its inhabitants.

On reaching my bungalow and staining the two slides with gentian-aniline-violet, I found them both full of the spirillum Obermeieri. This fact, taken in conjunction with the chief symptoms I have mentioned, is, I think, sufficient to establish the occurrence at Jeur of an isolated epidemic of relapsing fever. Whether it had been imported from Bombay, where the disease is endemic in certain quarters, I did not discover. Jeur is not situated in a district much influenced by famine, and its people, though exceedingly poor agriculturists, were not in great poverty, judging by their general appearance and that of their bazaar.

Close by the largest well, evidently the centre of washing operations, I found a grass-grown puddle containing an enormous collection of larvæ of some species (not identified) of Anopheles. I saw no signs of Culex. Whilst visiting the houses I was only able to find two or three Anopheles, and these I could not secure; yet there must have been numbers of them, although the inhabitants all seemed to agree that there were none.

There was no apparent relation between the infected blocks of houses and the situation of this breeding place of Anopheles. The bed bug was everywhere, as it usually is in such situations.

As it is possible that the bed bug may have some close connection with the transmission of spirillum fever, the following additional notes may be of interest here.

It is not uncommon during a morning's ramble through the narrow streets of Mandvi or Omerkadi, two of the most overcrowded quarters of Bombay city, and where spirillum fever seems to be endemic. to see a woman come into the middle of the roadway and tap a piece of wood upon the ground. On investigation it will be found that the piece of wood is a bug-trap. It is generally about a foot long by an inch or so square, and has several deep cuts made longitudinally on two opposite sides of it with a saw. Whether any special wood is used I do not remember. These bug-traps are placed by the better-class natives beneath their bed-clothes at night, and in the morning the bugs retire to the slits as being the most convenient and nearest shelter for the day. Hindu is debarred by his religion from killing any animal whatsoever. The good housewife, or one of them, therefore, instead of plunging the trap into hot water, takes it into the street and taps out the

bugs upon a stone, leaving them to crawl back to the nearest house. The act, like most acts connected with Hindu worship, savours greatly of a certain biblical character, who, wishing to call attention to his piety, prayed aloud at the street corner.

Whilst working in Bombay it struck me that these traps might be very conveniently used for collecting bugs for experimental purposes. I procured, therefore, a number from the bazaar, and had them placed in the beds of persons suffering from spirillum fever, and thus collected a quantity of bugs for examination. From one case, in whose blood I had the day previously found the spirillum, I obtained during the third night of the relapse some thirty bugs. These I kept, trap and all, in a Winchester quart bottle; and every day, with the exception of two, for a fortnight, I fed one of the bugs upon my arm, at the same time examining one which I had not fed. The result, however, was negative as far as my health was concerned.

By reason of its strong chitinous exterior the bug, like the flea, is extremely difficult to dissect and examine, and any suggestions tending to simplify the proceeding will, I feel sure, be welcomed by many besides myself.

## MALARIAL FEVER AS MET WITH IN THE GREAT LAKE REGION OF CENTRAL AFRICA.

By Albert Ruskin Cook, M.D., B.Sc.Lond., B.A.Camb. Late Scholar of Trinity College, Cambridge.

#### PROLEGOMENON.

THE importance of malarial fever in this country to every immigrant or native can scarcely be gainsaid. Regarded from a medical, social, utilitarian, or even political, point of view, it bulks large in practical every-day life. The country may be on the one hand, suddenly deprived of the services of a sagacious statesman at a political crisis, or on the other hand, its population may be steadily sapped by the ravages of this minute but almost invincible foe. The high deathrate of malaria amongst Europeans is well known. Practically no one who resides in the country for any length of time altogether escapes it, and even amongst the natives, as will be subsequently shown, it claims a very large number of victims, whilst the morbidity caused by it is even greater. Under these circumstances then, every item of intelligence that can be turned to useful account in attacking this scourge of man should be gathered up and placed on record. If tuberculosis has been proved to be a preventable disease, malaria must fall into the same category, and whatever method or combination of methods may be employed the struggle should never be regarded as hopeless or relinquished as Utopian.

It would be quite impossible to describe adequately, in such a short compass as the limits of this paper impose, the whole subject of malaria as met with in Central Africa. To do so would fill a volume several hundred pages long. All that the writer aims at is recording such points as may throw light on the more serious attacks of fever. Nearly five years' continuous

residence in tropical Africa, though too short for a comprehensive study of the disease, has at least afforded scope for recognising some few main principles. In the practice of the hospital to which I have the honour of being attached we see about 1,200 cases of fever yearly, and this affords an ample field of research. It is only fair to state that the commencement of the work was beset with difficulties. When I left the coast in 1896 it was a three months' march into the anterior to reach Uganda, and delicate instruments are not improved by being carried for such long distances on porters' heads. Fortunately the railway, now approaching completion, will alter all that. The publication of such a paper as the JOURNAL OF TROPICAL MEDICINE, the foundation of two schools of Tropical Medicine in England, and the advent of many excellent books on tropical diseases, all testify to the increasing intelligence with which the English people are endeavouring to grapple with the great malaria problem.

#### GEOGRAPHICAL EXTENT OF RESEARCH.

The following observations were made in a region bounded roughly by the Victoria Nyanza on the south, the Nile on the east and north, and the Albert Nyanza, Ruwenzori Mountains (Mountains of the Moon), and Albert Edward Nyanza on the west. The immense majority of cases of fever occurred amongst the Baganda, the hospital of which the writer is in charge being situated at Mengo, the capital of Uganda; but considerable numbers of Banyoro, Batoro, Banyankole, and Basoga were seen in journeys through the respective countries of Unyoro, Toro, Ankole, and Usoga. The number of cases of fever observed in Europeans was of course much less, the European population of Uganda being confined to missionaries, Government officials, and traders.

## NATURE OF COUNTRY.

Uganda is a country lying like a cap immediately to the north and north-west of the immense body of fresh water known as the Victoria Nyanza, which is situated over 3,800 feet above sea level, and has an area equal to twice that of Belgium. The Equator crosses the lake near its north shore, and thus runs through the south-west part of Uganda. The latter is very hilly, the hills being largely of the older geological formations, and rising from 100 to 400 feet above the level of the surrounding country. Separating each hill from its neighbour is a sluggish stream or swamp, choked with a dense growth of papyrus, so that a road from one village to another is a monotonous succession of hill and swamp alternately, the road being generally taken over the highest part of each hill. The swamps are crossed by rough causeways. The heat is not at all excessive, the thermometer in the shade of our heavily-thatched houses seldom rising above 86° F., even at mid-day, and what is more important remaining wonderfully uniform, only occasionally registering a temperature of under 76° F.

The year is divided into two rainy seasons, alternating with two dry ones; the former commencing in March and September respectively, and lasting some three months, but rain falls in every month all through the year.

The red deeply ferruginous soil is very productive, and but little labour is needed to raise food. The staple food of the country is bananas. With the exception of the chiefs and more wealthy men, who often get meat and milk, the immense bulk of the population live on nothing but steamed and mashed plantains, which they call "emere," and on sweet potatoes. Indian corn is regarded as a delicacy. Much "mwenge," as the native beer is called, is manufactured by fermenting banana juice and is freely drunk. All adults are well clothed with native manufactured bark cloth or imported American sheeting or linen. Children to the age of four or five are allowed to run about naked, and often get chills in consequence. They are frequently suckled for eighteen months or two years. The huts are not built close together, but scattered throughout their gardens. They have no windows, being of the usual conical shape, and ventilation is very defective. In many places the level of the subsoil water is only just below the surface; much of the soil is clayey. The prevailing wind during the daytime is from S. to N., during the night from N. to S.; this is doubtless owing to the proximity of the lake.

#### MORPHOLOGY OF THE MALARIA PARASITE.

Judging from the published descriptions of the malarial parasite in Davidson, Manson, Coles, &c., there is at least one species met with in Central Africa that is not described as occurring in Italy, Algiers, or China. Nor is this to be greatly wondered at. Africa is a large place, and if we except the admirable investigations carried out by Drs. Daniels, Christopher, &c., round Lake Nyassa and at Sierra Leone, but little has been done to elucidate the varieties of fever existing in Central Africa. It is obvious that the truth will only be arrived at by many workers in different places, each stating exactly what they find. When I left England in 1896, the only book available to me on the subject was Davidson's well-known work on Tropical Diseases. Since then books on malaria have greatly multiplied, and thanks to such books as Manson's, every practitioner in the tropics has, if he cares to take a little trouble, an excellent opportunity of enriching his own mind and adding to the general store of knowledge. Let me then first briefly indicate the agreements between such observations as I have been able to make, and the, what I may call, classical accounts of the parasites met with in the text-books, proceeding subsequently to point out the differences.

# METHOD OF PREPARATION.

(1) Fresh Specimen.— The finger-tip, after being cleansed, is pricked with a sharp sterilised needle (preferably a surgeon's Hagedorn needle), a minute drop of blood exudes, which is wiped off, and the next which wells out is touched with the centre of a clean cover-slip in such a way that it does not come in contact with the skin, and the slip is then lowered gently on to a perfectly clean slide. The preparation, either at once, or after being ringed with vaseline, is examined first under a low power to choose a part where the red blood corpuscles are disposed singly and not in rouleaux, and then a high power is turned

on to study more minutely the structure of any plasmodia present. For the latter purpose I generally use a  $\frac{1}{12}$  in. oil immersion and No. 3 eye-piece (Swift). This gives a very clear magnification of 730 diameters. A No. 5 eye-piece and lengthened tube increases this to 1,627 diameters if necessary.

The most important practical point in the above is to get really clean cover-slips and slides. This seemingly simple process is often most difficult. Boiling the cover-slips in 10 per cent. sodium bicarbonate solution, then rinsing in several changes of water, gently warming in strong sulphuric acid, and again thoroughly rinsing and finally keeping in absolute alcohol is perhaps the best of many methods. For use the cover-slip may be held for a moment in the flame of a spirit lamp to burn off the alcohol. Slides may be cleaned in the same way, but do not need to be

kept in alcohol.

(2) Stained Specimens.— The drop of blood that wells out from the pricked finger is touched with a fine piece of cigarette paper about 1 in. from its end. The latter is then touched to the surface of a clean glass slide, the droplet of blood allowed to spread out, and the paper drawn by its uncharged end along the surface of the slide. A little practice serves to produce a blood film in which the corpuscles are disposed in a perfectly even and regular manner. The film is then fixed by the slide being immersed for five or ten minutes in absolute alcohol contained in a wide-mouthed bottle. The slide is removed. allowed to dry, and a few drops of a stain consisting of borax 5 per cent., methylene blue 2 per cent., in aqueous solution blown gently on from a pipette, and allowed to remain on for about thirty seconds (Manson's method). The excess of stain is then washed thoroughly off with water, the film allowed to dry, a drop of xylol-balsam dropped on, and a coverslip applied. If the specimen be required merely for diagnostic purposes I generally mount in cedar-wood oil. Stained specimens have considerable advantages over fresh. You need carry with you only slides, cover-slips, cigarette papers, and needles-no small advantage when suddenly summoned fifty miles in this country, where everything has to be carried on men's heads. The films once made keep indefinitely, while the fresh specimens must be examined within a short time after their preparation. The stained films show the minute structure of the parasites, and what is more important, by this method one can survey, if the film be a good one, an enormous number of corpuscles in a very short time; the stained parasites standing out very clearly. At the same time fresh specimens alone show the amœboid movements of the intra-corpuscular form of the parasites and any phagocytosis on the part of the white blood corpuscles that may be going on, or the actively motile flagellated bodies.

The varieties of malarial parasites are usually divided into:—

$$\begin{array}{ll} \textbf{Class} & \textbf{I.-}Benign & \left\{ \begin{array}{l} \textbf{Quartan} \\ \textbf{Tertian} \end{array} \right\} & \textbf{Do not form crescents.} \\ \textbf{Quotidian--pigmented} \\ \textbf{Quotidian--unpigmented} \\ \textbf{Tertian} & \textbf{Form} \\ \textbf{Tertian} \end{array}$$

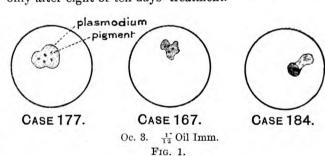
I may briefly dismiss the first class by saying they

are met with, though not nearly so commonly as the so-called malignant forms. A double tertian benign infection gives rise to the ordinary quotidian ague. A single tertian intermittent is the commonest type of fever amongst Europeans here. Quartan infection is distinctly rare. Details will be given under the clinical types of the disease.

As regards the members of Class II., we notice one marked difference. Crescents are very rarely seen, though the flagellated forms are not uncommon. The obvious deduction seems to be that the latter are derived from some other form of the parasite than the crescent. As the parasites belonging to the first group differ in no respect from those found in more

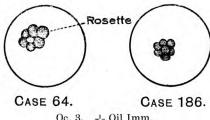
temperate climes, I will not describe them.

In a typical attack of severe African fever, characterised clinically by only imperfect remissions of temperature, an anxious "facies," incomplete rigors, or indeed mere sensations of chill, a non-perspiring skin, and often marked mental oppression, severe headache, and pains in the back and limbs, films prepared from the blood at any time of the day will, on being suitably stained, show the following appearances: Parasites will be noticed within a varying proportion of the red corpuscles of the blood. From 1 to 5 per cent. of the latter may be invaded, or even as high a proportion as 10 per cent. The proportion of attacked corpuscles in the peripheral blood seems, however, to be no index of the severity of the disease. In one of my cases, a European, a comparatively mild attack, though characterised by severe headache and subsequent feebleness, showed an infection of about 10 per cent. of the red blood corpuscles, while a fatal case examined only a few hours before death showed very few intra-corpuscular parasites. regards the result of the administration of quinine, it is often possible for days, in some of these cases, to discover many intra-corpuscular parasites, even while the patient is soundly cinchonised, and this doubtless explains the well-known clinical fact that even under the full doses of quinine the fever yields very slowly, the temperature reaching the normal line, it may be, only after eight or ten days' treatment.



Comparing the results of many observations I may say that the earliest stage is that of a minute unpigmented intra-corpuscular body. In a fresh specimen of blood (I cannot do better than quote Manson's description of it) it looks "like a little washed out smudge of a dirty white paint." This slowly increases in size, but never (in the form of fever I am now describing) attains a very large size, rarely exceeding in diameter one-fourth to one-third the diameter of a

red blood corpuscle. As it grows it becomes pigmented, the pigment being, in methylene blue pre-parations under a high power, of a reddish-brown colour and not intensely black like ordinary melanin. The pigment is in the form of fine dots or granules but is never very abundant. When full grown the parasite proceeds to sporulate; this process, however, takes place but sparsely in the peripheral blood, but time and patience will enable one to see very typical examples. The mature sporocyte consists of a varying number, 12 to 20 spores, arranged in a very definite mulberry-like mass, reminding one very much of the morula stage of the segmenting ovum. In the cases I have observed I should like to emphasise that the mature sporocyte by no means fills the whole red blood corpuscle. Usually the spores, which stain intensely, are too heaped up to see the pigment in the centre. The corpuscle breaks up and the spores set free, that is, such as escape being engulfed by the watchful phagocytes, proceed to attack fresh blood corpuscles.

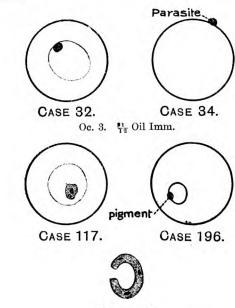


Oc. 3. 12 Oil Imm. Fig. 2.

Another feature of this irregular remittent type of fever is that parasites of nearly every age are met with in the same specimen, or perhaps two well-marked groups may be seen in varying proportions, e.g., a large majority young, but a substantial propor-

tion full grown.

Careful focusing shows that the shape of the young intra-corpuscular parasite is most variable, possibly due to its being fixed when in active amœboid movement. A very common appearance is to see a small sphere as though it were gummed on to the periphery of a red blood corpuscle, or lying just within the circumference. In its youngest form the whole parasite stains intensely, later on a flange or projection of lightly-stained protoplasm may be seen at one side, or a comparatively unstained body may surround the central darkly-stained part. Later again granules of pigment may be seen scattered over the whole stained surface. In a good many cases, too many to be merely accidental, I have noted blocks of reddish pigment lying eccentrically in the red blood corpuscles. It is just possible that these may have been deposited on the corpuscles and are not manufactured out of its substance. Some varieties seem to be quite unpigmented in the peripheral circulation. Probably the sporocyte matures and segments in the spleen, bone marrow, &c. The small size and scanty pigment in the earlier stages of the plasmodium render it difficult to see them in fresh preparations, when the parasites are few in number. For this purpose stained films have a distinct advantage. Thus in one case (No. 117 in my Series) a very perfect fresh specimen showed no parasites, though hundreds of corpuscles were carefully scrutinised under a high power. There had been no rigor and it was the first twenty-four hours of the fever (T. 100). A stained film taken at the same time showed large numbers of exceedingly small unpigmented parasites. Another common form, and one that quickly disappears under the influence of quinine, is the so-called "signet ring" parasite. In this kind the parasite assumes a delicate ring-like shape, with an eccentrically placed bulge which stains deeper than the rest. It may be unpigmented, but is usually studded with pigment granules. In a few instances I have found the same body apparently free in the plasma. Sometimes a horse-shoe shape is assumed.



CASE 121.

Gc. 5.  $\frac{1}{T_2}$  Oil Imm. Lengthened tube. Fig. 3.

### MULTIPLE INFECTION.

Not unfrequently two or even three parasites may be seen in one corpuscle; this indicates a grave attack. As a broad rule, if the blood be examined when the temperature is high only the smallest kind of parasite will be seen.

(To be continued.)

DR. S. CARSON RYNHARDT in his book, "With the Thibetans in Tent and Temple," mentions that there is no legitimate medical science in Thibet.

For headache large sticky plasters are applied; to relieve rheumatism a needle is plunged into the patient's arm or elbow. Teeth are extracted by means of a string, with the result that very often a part of the jaw bone is dragged away simultaneously. Persons suffering from the stomach are energetically belaboured, or a piece of wick steeped in boiling butter is applied to the part.

The remedies to be taken internally are often composed of a pellet of paper on which a prayer is inscribed. If this remedy takes no effect a second pellet made of the bones of a pious priest is administered.

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THE

# Journal of Tropical Wedicine

FEBRUARY 1, 1902.

LESSONS TO BE LEARNT FROM PRO-FESSOR BRUNO GALLI-VALERIO'S PAPER.

THE article in this issue of the JOURNAL, by Dr. Bruno Galli-Valerio, should be studied carefully as an object lesson in scientific investigation. Dr. Galli-Valerio has not succeeded in showing. in fact he makes no pretension to do so, how plague is transmitted to man, nor even that the rat plays an important, or any part, in the conveyance of plague from man to animals. article, however, is a clear exposition of our knowledge of the relations of rats to man as regards plague infection, and he demonstrates conclusively at what a fine point of scientific precision the investigation has arrived.

After discussing several plausible theories, showing where they are weak and where they are scientifically valueless, he brings us by his pro-

cesses of reasoning to this point, namely, that to prove the theory of the power of infected ratfleas to transmit the disease to man, man must suffer himself to be bitten by infected fleas. This of course is, has been, and will remain the halting point in many investigations of the kind; and, as in several recorded instances we find men willing to submit themselves to be experimented upon, so in this instance, Dr. Galli-Valerio is willing to become the subject of experiment, if such is considered necessary.

But important although these points may be, it is not on that account we wish to direct attention to this article. It is because Professor Galli-Valerio has given us information in regard to plague in a direction other than clinical and bacteriological. These have been the aspects of plague which have been dealt with by writers and observers well nigh exclusively, ever since 1894, when the modern pandemic declared itself in Hong Kong.

It is now eight years since Aoyama, Cantlie, Kitasato, Lowson and Yersin, gave us definite information concerning the signs and symptoms, the anatomical characters, the bacteriology, and even the serum-therapy of bubonic plague, and beyond the discovery of pneumonic plague by Childe in 1896, and important work by Haffkine and Hankin in India, subsequent investigators have practically been treading the same ground. They have given us stacks of literature—clinical, pathological, and statistical-but the additions to our knowledge of plague have been mostly details.

The various foreign scientific expeditions to India were disappointing, they but reiterated what was already definitely known, and for the most part wasted both time and money. Reports on plague may be necessary for Governments, but the men employed in drawing them up have often to spend their time and intellect on scientifically useless work. Valuable men, capable of a better and higher order of work, are chained to the slavery of routine to no purpose, and are compelled to do work which their training and capabilities pronounce to be unworthy of their attention.

Dr. Galli-Valerio's paper, as Dr. Manson says in his comments on the paper, "shows on what a slender basis of fact a catching theory may be founded and how it may gain popularity and even acceptance." According to Manson, the paper also indicates "the disinclination for workers in plague to step outside the well-worn ruts of the clinical observations and the bacteriology of the disease; for, except for two or three inconclusive experiments, nothing has been done to exploit the rat-flea theory."

The cause, the origin, or the mode of diffusion of disease, after the clinical facts and the bacteriology of the disease are known, should be the work which scientific investigators should take up, not as a side issue, but as the kernel of the question. The prophylaxis naturally follows upon the discovery of the cause or of the means of transmission. Dr. Galli-Valerio's paper will serve as a guide in future to medical practitioners who wish to investigate the causes of disease, and there is no medical man, however isolated, who cannot devote his attention to the elucidation of the cause of disease on the lines laid down by the writer of the article in question.

# Article for Discussion.

# ON THE DANGER OF SUBCUTANEOUS INJECTION OF QUININE.

By J. PRESTON MAXWELL, M.B., F.R.C.S.

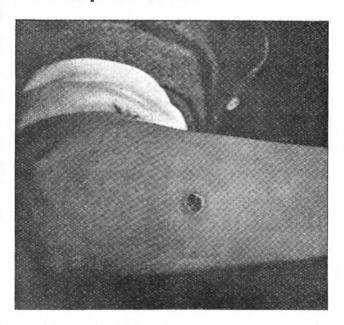
DR. TOWNSEND'S letter and Mr. Cantlie's comment on the same re the subject in hand, raise a matter which is of the utmost importance to those working in malarious countries. And as the writer has had personal as well as practical experience of the same, a few remarks on the subject may not be deemed out of place.

Some seven years ago, when preparing to come abroad, my father, Dr. Maxwell (late of Formosa, Japan), and I carried out some experiments on this matter, using most of the available salts of quinine, including an oleate and a borate, with the intention of determining the safest and most pleasant way of administering this injection. On one occasion my father produced the gangrenous patch on his forearm which is shown in the accompanying photograph, and on another occasion I spent a week in the isolation ward of the

hospital, where I was at that time studying, with a curious form of cellulitis of the arm.

As I believe both of these accidents to have been due to the use of a too concentrated solution, I will briefly give the details of the last named. On one evening, about 5 p.m., I injected into the extensor surface of my left forearm a solution of 5 grs. of the hydrochlorate dissolved in the absolute minimum of water. The solution was injected warm.

After half-an-hour I had slight cinchonism and my arm began to swell, and by next morning was swollen up to the shoulder and very painful. There was no tenderness in the axillary glands and the temperature was 99° F.



Although the fullest antiseptic precautions had been taken I feared that I must have poisoned myself, and went off to hospital. My temperature never reached 100° during the whole illness, and in a week my arm was of its normal size.

A small cold abscess formed at the point of inoculation, was opened, and a few minims of pus let out. There has been no further trouble from the same. Agar-agar and gelatin tubes were inoculated from this pus but failed to yield any growth. My own opinion was, and is, that the abscess was due to chemical, and not microbic action.

My father, who used much the same injection at the same time, had a similar train of symptoms, but these were not so severe, and the injection did not produce any tissue death. Since that time I have always handled hypodermic injections of quinine with respect, but am by no means willing to abandon the method, as its efficacy is undoubted, and where quinine is not tolerated by mouth or rectum it may prove the

only possible method of introduction. For the last three years I have given quinine hypodermically in the following way:—

(1) The injection should be intramuscular, not

subcutaneous.

(2) The gluteal, scapular and deltoid are the muscles best suited for this method, and especi-

ally the first named.

(3) I use an injection consisting of 6 grs. of the hydrochlorate (Burroughs, Wellcome and Co.'s tabloids) to forty minims of boiled water. This solution is brought to boiling point and allowed to *cool*. The essential point is a large dilution of the acid salt.

(4) After injection, which is always painful, I paint Linimentum Iodi over the point of injection and the surrounding area. This plan was recommended very warmly by Dr. Sims, of the Congo,

who was a strong advocate of the method.

As to results, I have never seen any untoward occurrence by this method. None of the injections gave rise to any trouble whatever, although in one case, a debilitated youth with malarial ascites, I injected 6 grs. every two days for a fortnight into various muscles, taking no situation oftener than once in six days.

One matter should be borne in mind. I do not think that injections are absolutely safe in the case of those suffering from any form of acute septic ulceration, as in these cases there is a possibility of the area of injection being infected

from within.

With reference to the question of sepsis. The more irritating an injection, the more damage does it do to the tissues and the more careful must one be with one's antiseptic precautions.

I should not wish to charge all those who are unfortunate enough to meet with suppuration in the use of this method with being careless or dirty, but I do emphatically protest against the argument from strychnine injections. In many cases the wonder is not that these injections do not cause suppuration, but rather that they do not more often do so.

And I have very little doubt that if I were to inject quinine as I have more than once seen strychnine given I should have no lack of suppuration. I quite agree with both Dr. Townsend and Mr. Cantlie that when suppuration does occur from a quinine injection it is apt to be tedious and difficult to cure.

#### NOTE BY MR. CANTLIE.

If the abscesses which follow quinine and strychnine subcutaneous injections are to be attributed largely to sepsis, how is it that abscesses or cellulitis are so seldom seen after hypodermic injections of morphia, or morphia and atropine? The number of hypodermic administrations of morphia compared with those of quinine, strychnine, &c., may be safely said

to be 1,000 to 1, yet it is quite the exception for morphia injections to be followed by any untoward sequelæ. İs it that extraordinary precautions are taken against sepsis when morphia is used? I think not; every practitioner is well aware that, even before Listerism taught us to be more careful in even our minor manipulations, hypodermic injections of morphia were abundantly practised without necessarily local subsequent inflammations following. is it to be attributed to carelessness on the part of the practitioner in the tropics. Every one who knows the medical practitioner in the tropics is well aware that he is certainly not behind his fellow practitioners at home, and were I to push comparisons between the two my testimony would be certainly even more pronounced than the negative statement that "he is certainly not behind." I agree with Dr. Maxwell that the abscesses, &c., which follow quinine injections may be attributable to "chemical, and not microbic action.'

# Rews and Notes.

Messrs. J. Defries and Sons, Limited, 147, Houndsditch, London, E.C., the well-known manufacturers of the Pasteur Chamberland Filter, of the Equifex Disinfectors, steam stoves, and of various other appliances, which are daily proving their usefulness in public health matters, are distinguishing themselves in quite another direction. It appears that this enterprising firm produced some of the most important public decorations and illuminations during the reign of Queen Victoria, and in fact as long ago as the coronation of Her Majesty contributed largely to the decorations of the streets of the metropolis on that important public occasion.

That their abilities as public decorators and illuminators have not been forgotten are amply testified by the fact that Messrs. Defries have been appointed decorative illuminators to His Majesty, King Edward

VII.

That the work of the firm in this direction is not detracting from their efforts on behalf of the public health, is vouched for by the continued confidence their appliances command. In testimony thereof it may be remembered that the *Ophir*, with the Heir Apparent to the Throne on board, was supplied with their Pasteur filters.

In tropical countries, the practitioner is often at a loss for consulting-room appliances in the way of light suitably and conveniently arranged for ophthalmic, aural and laryngeal examinations, owing to the want of electric light or gas in his vicinity. Messrs. Defries, by their attention to the manufacture of illuminators, are likely to be called upon by medical practitioners in warm climates to supply their wants in this direction, and we have no hesitation in saying that their requirements will be fully and satisfactorily met.

# Current Miterature.

Papers in the British Medical Journal of January 25, on Tropical Diseases.

# I.—THE OPERATIVE TREATMENT OF LYMPHANGIECTASIS OF FILARIAL ORIGIN.

Lt.-Col. J. Maitland, I.M.S., Professor of Surgery, Madras Medical College, draws attention to the marked relief he was able to give in several cases of lymphangiectasis of the glands of the groin by removal of the mass. A number of similar operations have from time to time been reported, more especially by surgeons in Madras, and the benefit to the patients has, in practically all cases, been considerable. In some there has been entire cessation of attacks of fever and pain, and in several the disease would seem to be eradicated.

The success of these operations forms a welcome addition to the treatment of filarial infection and its sequelæ; and although the *rationale* of the operation is at present somewhat obscure, practice has proved that is is often successful in relieving the patient from the periodic attacks of fever and pain. In none of the cases recorded has lymphorrhagia, or the formation of lymphatic fistulæ followed the operation; nor has there been any evidence of a tendency to septic

inflammation after the operation.

Lt.-Col. Maitland states, in his description of the operation, that he removed the entire mass of groin glands; where this is possible it is conceivable that his contention, that "the first principle of preventive treatment in such cases should be to endeavour, if possible, to remove the parasites," places the operation on a sound basis. It is seldom, however, the groin glands are alone enlarged, and where the enlargement extends along the iliac vessels the good to be gained by removing the groin glands only, is more difficult to understand. Perhaps Lt.-Col. Maitland's remark that "it is extremely probable that the stasis of lymph which follows ligature of the vessels results in the death of the parasites," even when centripetally placed, is correct. It is, at any rate, a distinct advance towards affording a scientific explanation of the good resulting from an operation which has heretofore been condemned on account of its empiricism.

# II.—Observations on Human Filariasis in Trinidad, W.I.

George A. Vincent, M.B. C.M., Trinidad Medical Service, gives the following table showing prevalence

Race	Number Examined	Number with Filaria	Per- centage with Filaria	Number with Elephantoid Disease	Percentage with Elephantoid Disease
Blacks (ne-	323	16	4.9	21	6.5
Whites	55	6	10.9	8	14.5
East Indians	122	3	2.4	4	3.2
-	500	25 or 5 %		33 or 6.6 °/ <sub>o</sub>	-

of filaria and filarial disease in 500 cases taken indiscriminately from persons dwelling in Trinidad.

The majority of the whites examined were natives of Barbadoes and Demarara, where filarial ailments

are frequent amongst the white population.

In his remarks upon the prophylaxis of filarial ailments Dr. Vincent states "that filariasis is transmitted through mosquito bites, admits of little doubt, whatever may be the other means by which infection may be carried, and protection from infection practically means protection from mosquitoes." It may be possible to rid a locality of Anopheles, as they require special conditions for breeding, but as culices breed in any collection of water, their extermination is no easy matter. "Much may be done even in the case of culex by protecting our stored water and frequently emptying all collections of water, so as not to allow sufficient time for the larvæ to mature. Meanwhile the only safeguard is to be found in the habitual use of mosquito nets, especially when in the neighbourhood of known filariated individuals. If the malarial subject is a source of danger to those around him, a filariated individual is doubly so, for in his case the carriers of infection are drawn from the ranks of a very common species of mosquito, as well as from the rarer species to which we owe malaria."

### PLAGUE.

PREVALENCE OF THE DISEASE.

India.—During the weeks ending December 21st, December 28th, and January 4th, the number of deaths from plague throughout all India amounted respectively to 9,198, 8,005, and 9,556.

In the city of Bombay the deaths from plague during the three weeks in question numbered 175, 180

and 213 respectively.

In Calcutta during the four weeks ending January 4th there were 149 plague seizures and 136 deaths from the disease.

EGYPT.—During the two weeks ending January 20th 31 fresh cases of plague were recorded in Egypt and 25 deaths from the disease. The majority of cases occurred in the town of Tantah.

CAPE OF GOOD HOPE.—At Port Elizabeth and Mossel Bay 1 and 2 fresh cases of plague respectively were reported during the week ending January 11th. No deaths from plague were notified anywhere in Cape Colony.

MAURITIUS.—During the weeks ending January 16th and 23rd the number of fresh cases of plague amounted to 27 and 14, and 21 and 7 deaths from the

disease.

UNITED STATES OF AMERICA.—Up to November 4th, 1901, as many as 51 cases of plague were reported in San Francisco.

At Utah, Salt Lake city, on November 2nd, a death from plague was reported.

CANCER AND MALARIA.—Professor Kruse, from a statistical study, reaches the conclusion that, in climates where malaria is prevalent, cancer is not often found. He does not attribute this to the presence of malaria, but rather to an immunity of the tropical races to cancer.—Münchener medicinische Wochenschrift, November, 26th, 1901.

No Yellow Fever in Havana. — Major W. C. Gorgas, Chief Sanitary Officer at Havana, in his report to Governor-General Wood for November, says: "During the month we have had no cases and no deaths from yellow fever. This can be said of no preceding November since 1762. Last year we had, during this month, 214 cases and 54 deaths. This year the last case of yellow fever occurred on September 28th; that is, we have gone over two months without a single case or death belonging to Havana. I consider this a demonstration that Havana has at last been freed from the infection of yellow fever. It must be remembered that October and November are the months when yellow fever is rife in Havana, and that, for the past century, there has never been a day during the two months when there were not many cases in the city. This result I consider due to the system introduced last February of killing infected mosquitoes in the neighbourhood of each point of infection as it developed."

A Congress on Pellagra.—A national Italian Congress on Pellagra is announced for May, 1902. Papers will be presented regarding etiology, treatment, and means of prevention.

BABOOL LEAVES AS A CURE FOR HYDROPHOBIA .-The terrors of hydrophobia and difficulty of a curethe Buisson bath system not being resorted to as widely as its merits deserve—are sufficient reason for making known any remedy that seems reasonably well attested. Dr. J. E. Chamarette (retired surgeon, H.H. the Nizam's artillery, regular troops), residing at Hyderabad, Deccan, has made the following communication to The Indian Medical Gazette, November 6th, 1901: "It is now over twenty years that I have been administering in all cases of dog bite, be it inflicted by seemingly good healthy animals, or dogs with unmistakable signs of rabies on them, the juice of the babool leaves. This plant is widely known and grows commonly about gardens and all around the jungles. (Native names of the plant— Dewanha babool, Hindi; Moorkie thoomha, Telugu; Pea vallume, Tamil. Species of Babulæ acacia, ferinacia) . . . . I am extremely obliged and indebted to my much esteemed friend, Mr. Charles Prayero, of Hugheston, Hyderabad, a retired Extra Assistant Commissioner of the British Service, for placing me in possession of this invaluable drug and prophylactic, while he himself has with success followed this plan of treatment, I believe, for over fifty years. . . . Previous to administering the Babool juice, I have the wound or wounds squeezed out of as much blood as possible, and thoroughly syringed and bathed with hot water, cleaned and dried; after which, with a nicely pointed piece of lunar caustic (Argenti nitras), every part and recess of the wounds are freely touched, probed and rubbed into satisfactorily. Dose of the Babool juice: the leaves should be washed in water and pounded in a clean mortar and strained through fine muslin. For adults, 1 or 11 ounce of the juice given morning and evening on an empty stomach (no food, &c., to be taken until an hour after); juice to be administered

regularly for three days and prepared fresh on each occasion. Should nausea or vomiting occur, a tablespoonful of sweet tyre (milk curds) native name 'chuckka dhye,' should be taken to allay these symptoms. Dose for children of riper years, from to the above quantity of juice. Diet to be observed three days only: boiled rice or wheaten cakes cooked without any salt, and eaten with milk curds, chuckka dhye, a little weak tea. Stimulants of any and every description to be strenuously eschewed.

## EXCHANGES.

Annali di Medicina Navale. Archiv für Schiffs u. Tropen Hygiene. Archives de Medicine Navale.

Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie.

Australasian Medical Gazette. Boletin de Medicina Naval. Boston Medical and Surgical Journal. Bristol Medico-Chirurgical Journal.

British and Colonial Druggist. British Journal of Dermatology. British Medical Journal.

Brooklyn Medical Journal. Caducée.

Climate. Clinical Journal. Clinical Review.

Giornale Medico del R. Esercito.

Hong Kong Telegraph. Il Policlinico. Indian Engineering.

Indian Medical Gazette. Indian Medical Record.

Janus.

Journal of Balneology and Climatology. Journal of Laryngology and Otology.

Journal of the American Medical Association. La Grèce Médicale.

Liverpool Medico-Chirurgical Journal.

Medical Brief. Medical Missionary Journal.

Medical Record. Medical Review. Merck's Archives.

New York Medical Journal. New York Post-Graduate.

Pacific Medical Journal. Polyclinic.

Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo.

Sei-i-Kwai Medical Journal. The Hospital.

The Northumberland and Durham Medical Journal. Treatment.

# Notices to Correspondents.

1.-Manuscripts sent in cannot be returned.

2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

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In order to meet the constant enquiry for addresses of respectable firms catering for the various requirements so difficult to obtain abroad, we give a list of names and addresses which we trust will be found useful to our numerous correspondents and subscribers.

# Original Communications.

# SLEEPING SICKNESS IN UGANDA.

Dr. Patrick Manson, C.M.G., F.R.S., in forwarding the accompanying letter and notes on "Sleeping

Sickness in Uganda," observes :-

Some time ago you published a paper from Dr. T. Howard Cook, of Uganda, on the subject of sleeping sickness. I forward you a letter lately received from Dr. Cook, which bears out in a remarkable manner his gloomy forecast as to the probability of the extension of disease in that country. I duly received the slides of blood to which Dr. Cook refers in his letter. The films were rather defective as regards quantity of blood, a circumstance which to my mind quite explains the absence of filariæ in a proportion of the cases in which the parasite was found by Dr. Cook. Of the 26 slides I found Filaria perstans in the following: 3, 4, 12, 18, 14, 5, 16, 25, 19, 21, 9, 13, 15, and 17.

I notice in a recent publication by Portuguese investigators that they failed to find Filaria perstans in the considerable number of cases which they studied in Angola. Seeing that the parasite is very common in the neighbouring Congo district, and that I have found the parasite in blood from patients from San Salvador in Portuguese territory, and that it occurs in the Island of Fernando Po, I suspect that the failure of the Portuguese investigators was owing, not to absence of parasites, but to unsuitable technique.

I hope to send you for publication presently a translation of the Portuguese paper.

C.M.S. Hospital, Namirembe,
Mengo, Uganda Protectorate, E. Africa,
December 13th, 1901.

DEAR DR. MANSON,—I am sending you by this mail twenty-six smears taken from a series of con-

secutive cases of sleeping sickness that came to our dispensary for treatment. I no longer admit them to our hospital. All were from patients clinically perfect types of sleeping sickness, and in all except No. 11 (who died in hospital) I easily found the Filaria perstans after examining a film or two of the blood. In No. 11, though I frequently examined the blood, I did not find any worm. I shall therefore be much indebted, or a little surprised, if you find Filaria perstans in film No. 11.

The films are numbered to correspond with en-

closed notes.

I hope soon to send you fifty films taken at random from apparently healthy natives, to see if Filaria perstans is found in the healthy natives in these

parts.

The prophecy I gave at the close of my paper (published by your kind recommendation in the JOURNAL OF TROPICAL MEDICINE for July 15th), to the effect that we should soon have more abundant material to study, has unfortunately come only too true. On one island alone (Burruna on V. Nyanza) over 200 natives have died of sleeping sickness, and in many places it exists in epidemic form. Then in the districts of Kyagwe, in Busoya, and latterly round Mengo, it is slaying literally hundreds. I see personally from four to six new cases every week at our Mengo Dispensary.

I shall be much obliged if you will kindly acknow-

ledge the safe arrival of the films.

Anything in this letter that you think ought to go to the JOURNAL OF TROPICAL MEDICINE, I shall be much obliged if you will forward to the Editor under "Correspondence."

Believe me, yours sincerely, J. Howard Cook.

### NOTES.

F. P. = Filaria perstans.

(1) Levi Myukakitunzi: F. P. found. Came back from war in Nandi and got ill; pain in head and

chest; tongue tremulous; no salivation; no tremors

of limbs; no glands in neck.

(2) Lukiya: Hospital cook; drinks Namirembe water; has phthisis; blood taken September 20th, 1901; illness began in August, 1901; thinks she is better; had great itching; better now; glands in

(3) Zakayo: Child; very tremulous; tongue and body tremulous; F. P. found; glands in neck not enlarged.

(4) Tito: Illness two and a half months; tremors

of tongue and limbs; F. P. found.

(5) Faida: Lives at the "lubiri," Mengo; ill two months; F. P. found; glands in neck not enlarged;

obviously drowsy.

- (6) Yokana: Pain in chest; came back from Nandi war ill with disease; not drowsy; says he does not sleep in daytime; skin irritable; rubbed on paraffin; slight glands in neck; F. P. found; November 11th blood examined again; F. P. not found; not drowsy.
- (7) Danieri: Three months ill; glands in neck; no itching; typical aspect; from Kyagwe; F. P.
- (8) Muyoujo: From Kyagwe; lived with No. 7; three months ill; glands in neck; itching; illness began same time as No. 7.
- (9) Yesi: Illness began eight months ago; contracted in Bulemezi; body does not itch; glands in neck; staggers when he walks.

(10) Nsiko: three months ill; no glands; no

itching; F. P. found.

\*(11) Masitafa: In-patient; F. P. not found after three examinations; undoubted case of sleeping sickness; died October 19th, 1901.

(12) Susannah: Lives in Busi; taken ill last month; no itching; cervical glands enlarged; tongue tremulous; has special trembling at monthly periods; F. P. found.

(13) Mugatira: Taken ill six days ago, when film was taken; F. P. found; skin very irritable; cervical glands enlarged; complains chiefly of weakness; very tremulous.

(14) Wembuya: Has drowsy aspect; F. P. found; skin used to irritate; not now; glands in neck; tremulous.

(15) Erisa Makerere: Began to be drowsy nine days ago; fifteen F. P. found in one preparation; no glands in neck, except at angle of jaw; body irritable; tongue tremulous.

-: Began to be drowsy a week ago; F. P. found; glands in neck enlarged; skin very coarse.

- (17) Mikieri: Lives at Jungo; no glands in neck; skin not irritable; F. P. found; says he has greatly increased in drowsiness; blood tested a fortnight ago; no F. P. then found.
- (18) Seruzi: Three months ill; tongue very tremulous; trembles as he walks; used to itch; does not now; glands in neck; F. P. found.
- (19) Tabita: Tongue tremulous; ill one and a half years; pain in chest; F. P. found; body never itched; tongue and body tremulous.
- (20) Mukasa: Has been ill one and a half years; F. P. found; glands in neck; skin irritable; not very tremulous.

(21) Balirwana: Has been ill five days; F. P. found; tremulous; skin not irritable; glands at left side of neck.

(22) Yudesi: Has been ill two months; F. P. found; had an attack of madness a few days ago; tongue very tremulous; skin irritable; small enlarged glands at left side of neck.

(23) Teretiwo: Was taken ill last month (October); F. P. found; tongue tremulous; skin not

irritable; enlarged gland left side of neck.

(24) Mudu: Ill one month; F. P. found; lives in Bulemezi; tongue tremulous; skin irritable; glands under left jaw.

(25) Mukasa: Child; taken ill three days ago; tongue tremulous; no itching; distinct glands each

side of neck; F. P. found.

(26) Musibika: Child; ill one month; tongue not tremulous; skin not irritable; glands in neck; F. P. found.

## HÆMORRHAGIC PANCREATITIS IN ACUTE MALARIA.

By W. G. Ross, M.D., and C. W. DANIELS, M.B. London School of Tropical Medicine.

The case, of which the history is related, presents several points of interest. There was hæmorrhagic pancreatitis and very extensive necrotic and other changes in the stomach and intestines, and yet pain was not a marked symptom in the course of the disease. There was nothing in the clinical history or in the symptoms, during the short period the patient was under observation, to indicate a malarial infection.

# HISTORY OF CASE.

July 30 .- P. S., aged 23, Fourth Officer Mercantile Marine, native of England, last voyage from Port Said, brought on stretcher from ship.

History from ship's surgeon: On 27th inst. surgeon thought he was looking ill when going about on deck, and sent him to bed; found he had slight pain and tenderness in the epigastrium. The same day hæmorrhage set in from the stomach and bowels, and recurred up to date of admission. hæmorrhage was frequent and profuse. Patient had been on a run between Brindisi and Port Said, and was sent home to join another ship. Had not been ill from malaria. Had climbed up the mast to the truck about a fortnight before the attack, but had not apparently injured himself in any way.

Symptoms on admission, 2.15 p.m.—Temperature 102.8; pulse 140, small; skin cool and wet with perspiration, beads of sweat on face; is pale, but not anæmic, conjunctivæ, tongue, lips and finger nails good colour; tongue slight white coating; heart and lungs normal; liver area normal; spleen enlarged; felt just below costal margin neither hard nor Abdomen: does not complain of pain, no tenderness, not tympanitic; no tumour discoverable. Urine 1020; acid clear, no albumen, no sugar.

5 p.m.: Vomited 8 ozs. of reddish-brown fluid, with a few dark clots. Shortly afterwards passed two stools of a similar character to the emesis, about the

same quantity, odourless, and containing no fæcal matter. Ordered milk and lime water, iced. Pil. plumbi cum opio, four hourly.

8 p.m.: Temperature 98.4; is very thirsty; skin cold and clammy. Ordered Valentine's meat juice

hourly; iced barley water.

10 p.m.: Temperature 97.4; pulse 120; stronger; skin not so cold. Has dozed a little, but wakes on being approached, and calls for drink.

July 31.—2 a.m.: Temperature 96.4; pulse 120;

skin warm and moist; sleeping.

8 a.m.: Temperature 97.6; pulse 100, fuller and stronger; skin warm and moist; voice of fair strength. Has slept for the most part. Says he feels much better, but very weak from previous loss of blood.

of blood. No tenderness of abdomen.

1.30 p.m.: Vomited 10 ozs. of fluid, reddish-brown colour, and a few clots, and in half an hour passed four stools of same character as emesis, and the quantity in all about 10 ozs. Was in great abdominal pain and distress; features pinched; respiration hurried; pulse 160; bathed in perspiration; abdomen tender; greatest tenderness between umbilicus and pubes. Hypo. morphine m. iv., atropine m. ii. given:

2 p.m.: Lips and finger nails cyanosed. Patient became unconscious; became rapidly collapsed, and

died at 2.15 p.m.

Post mortem.—Six hours after death rigor mortis marked; body not cold; extensive staining (post mortem) on dependent parts; no signs of putrefaction; abdomen not distended; partial post mortem only allowed, all the viscera being removed through the abdominal incision. Body that of well-nourished, muscular young man. Moderate amount of subcutaneous fat; muscles a good colour, and in good condition; no excess of peritoneal fluid, and no hæmorrhage into cavity of peritoneum. There was blood-stained effusion under the peritoneum in the vicinity of the pancreas, at the base of the mesentery, and in small patches on various parts of the visceral peritoneum, but no actual hæmorrhages. whole extent of the stomach and intestines was of a dusky-red colour, the intestinal walls were thin and flaccid, and the intestines not distended. The abdominal organs were removed en bloc. The pancreas was then seen to be of an intensely deep red colourin sections almost black-not softened. On opening the stomach a considerable amount of blood-stained fluid gushed out, and the whole contents of the small and large intestines were of a similar character. mucous membrane of the œsophagus was pale and normal in appearance. The whole internal surface of the stomach and small intestine was intensely congested. This congestion was greatest in the stomach and duodenum, and gradually diminished in intensity towards the ileum. The large intestine was similarly affected in a much smaller degree. The liver was enlarged, weight 5 lbs., soft and friable. The spleen, red in section, weighed 15 ozs., and was soft but not diffluent. The other abdominal viscera were healthy. The pleural and pericardial cavities could not be examined, but did not contain excess of fluid or blood clots; no adhesions. Lungs and heart perfectly healthy, and the latter contained

some recent red *post-mortem* clots. The gall-bladder was distended with very dark green bile. The brain was not examined. No fat necrosis noticed.

Microscopic examination of the pancreas showed numerous extravasations of blood; some of these, particularly those under the capsule, were extensive, but the greater number were small between the lobules, and sometimes separating the individual cells. In the portions examined neither cells nor fat was necrotic. The striking feature of the sections was the manner in which all the smaller capillaries were blocked with malarial parasites (autumno-æstival). Of these parasites, the majority were either sporulating or in a stage just before sporulation (vide drawings). The blood corpuscles in the larger vessels and in the extravasated blood did not contain any parasites.

The stomach and intestines showed a similar accumulation of parasites in the capillaries. In the mucosa, and to a small degree in the submucosa, there were numerous blood extravasations. The superficial layers of the mucosa were necrotic, and had been invaded by micro-organisms of several species, but a streptococcus was the most abundant

and most constantly met with.

In the spleen, liver, and kidneys, and lymphatic glands, an occasional malarial parasite was found after a prolonged search, but in no part was there any accumulation of parasites similar to that met with in the pancreas and intestines. There was no evidence of any but quite recent malaria in any of the organs.

No micro-organisms, other than malaria parasites, were found in any organ but the alimentary canal. There was little evidence of hæmolysis, but there were a few yellow granules in the hepatic cells and in the spleen; there were a few granules giving the

reactions of loosely-combined iron.

The probable sequence of events is as follows:—An infection with malaria took place at Brindisi. During the voyage home the malaria remained latent, or at any rate, the parasites were not in sufficient number to cause marked symptoms of "fever." At each sporulation they increased in numbers, and in this case sporulation took place in the capillaries of the intestines and pancreas. Local blood stasis, due to the blocking of the capillaries in these regions by the parasites, was produced, and caused sufficient damage to the mucosa to allow the micro-organisms present in the intestinal contents to invade it. A superficial necrosis of the mucosa resulted from the effects of the bacteria on the congested intestinal walls.

Whether the pancreatitis was directly due to the malaria parasites, or of secondary bacterial origin, it

is impossible to ascertain.

Cases of hæmorrhage into the alimentary canal have been recorded by many observers as a rare complication of malaria. Hæmatemesis, melæna, or motions of a more dysenteric character, have been observed. Recovery is the rule, but in fatal cases the capillaries have been found—as in this case—blocked with corpuscles containing malarial parasites. In some of the cases, collapse has been the prominent feature. In one such case under my own

(C. W. D.) observation, there was both hæmatemesis and passage of blood by rectum, associated with profound collapse. This hæmorrhage did not recur, as quinine was given hypodermically, but I (C. W. D.) am informed that subsequently there was methæmoglobinuria, and the case terminated fatally from suppression of urine.

The causation of the algid forms of malaria is probably closely connected with an accumulation of the parasites of malaria in one of the abdominal viscera instead of in the commoner sites, the brain or

The main points of interest in this case are: -(1) The unusual site selected for the sporulation of the parasites, viz., the pancreas. (2) The hæmorrhagic pancreatitis associated with the condition. (3) The absence of any previous symptoms of malaria. (4) The extensive invasion of the alimentary tract by the malaria parasites, and the secondary necrosis of the mucosa, though this must have been mainly due to the bacterial invasion.

#### MARGINAL ULCERATION OF THE GUMS OCCURRING AMONG NATIVES EAST CENTRAL AFRICA.

By NEIL MACVICAR, M.B., C.M. Late Medical Officer to the Blantyre Mission, British Central Africa.

This disease (native name chikusa), is common among the natives of the Shire Highlands. It is an unpleasant and painful malady, though so far as I have seen it is not dangerous to life. I have not

seen it anywhere described.

The ulceration commences at one spot on the alveolar margin of the gum, commonly in front, and in a few days it has spread a couple of inches or more along the gum. In advanced cases the narrow line of ulceration may extend continuously the whole length of both upper and lower jaws, from one side of the mouth to the other. It neveror very rarely-extends outwards further than a quarter of an inch from the teeth.

The ulcerated surface presents an eaten-out appearance, discharges dirty-looking pus, and is speckled with blood clots, indicating the mouths of bleeding arterioles. There may be a good deal of bleeding. The ulceration eats in so as to expose the roots of the teeth, which, in consequence, become very loose. Sordes collect on the teeth close to the ulcer. The gums are swollen and purplish in colour. The breath is offensive. The tongue is usually only slightly coated. There is no accompanying sore throat.

The disease lasts for weeks, though how it would end if untreated I do not know. If at all extensive, it prevents the sufferer from eating solid food.

The cause of this disease is, I should think, a specific micro-organism, though what its nature may be, or in what way it gains access to the gums, I have not been able to investigate. I have not noticed its occurrence in different members of the same family, or other evidence of its being transmitted from person to person. It occurs at all ages, except among infants. The worst case I have seen was that of a child, aged 4, whose teeth seemed almost to be dropping out, and whose whole face was so much swollen that the mouth could hardly be opened. Many of the patients were well-nourished young men and women, who, moreover, were habitually careful about the cleansing of their teeth after meals.

Treatment.-After experimenting with various antiseptic mouth washes, I found that by far the most effective was a moderately strong solution of permanganate of potash. This, if used frequently half a dozen times a day, or oftener in bad cases-will in a few days cure even the worst cases. When, owing to the swelling, it is difficult for the patient to move the lotion about in his mouth, it can be applied by means of a camel's hair brush gently pushed along between the gum and the cheek. Under this treatment the fætor rapidly disappears, and the edge of the ulcer grows in towards the teeth. Even after complete cure, however, I have seen the roots of the teeth remaining exposed owing to the loss of tissue.

NOTE ON HEMORRHAGIC BULLA OF THE MOUTH.

I was much interested in Dr. Preston Maxwell's account (Journal of Tropical Medicine, July 1st, 1901) of this condition as it occurs in China, because I had myself met with a case in Central Africa similar to the ones he describes.

The patient was a young man, a native of the Katanga district of the Congo Free State. The bullæ had appeared, he said, some weeks before I saw him, while he was passing through Mpeseni's country on his way to Blantyre.

I saw a black bulla covering an area about the size of a threepenny piece on the dorsum of the tongue, just to the left of the middle line. Three smaller ones were seen on the inner aspect of the lower lip. On the following day the bullæ had burst, and there were clots of blood in the mouth. Two days later the places had almost healed.

After reading Dr. Maxwell's account of his cases, I am inclined to think that I may have misunderstood the patient when I took him to say that the bullæ had been there for so long a time. He may have been referring to the onset of certain other symptoms, apparently due to a mild attack of dysentery, from

which he appeared to be suffering.

This is the only case of the kind I have seen, and the bullæ were much smaller than those described by Dr. Maxwell. The case, however, appears to be of a similar nature to his, and as its occurrence in Africa may be of interest to investigators, I have ventured to publish this note.

BACTERIOLOGICAL LABORATORY IN TURKEY .- The Sultan has sanctioned the erection of a bacteriological laboratory at Silvi-Bouroun, an isolated spot on the Bosphorus, near Beicos. Huts for plague cases are already in existence there. The Turkish Government has sent Drs. Chevki Bey and Nilrath Bey to India to study plague.

MALARIAL FEVER AS MET WITH IN THE GREAT LAKE REGION OF CENTRAL AFRICA.

By Albert Ruskin Cook, M.D., B.Sc.Lond., B.A.Camb. Late Scholar of Trinity College, Cambridge.

(Continued from p. 43.)

#### MOTILE BODIES.

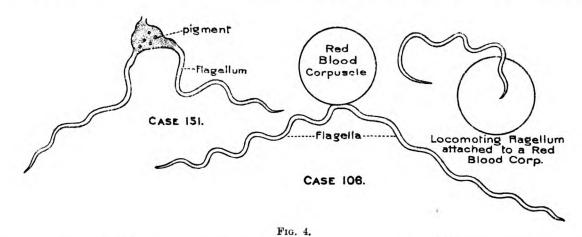
These are of two kinds; the first consists of very small pigmented bodies possessed of most active movements and most distinctly locomotive. Their motion is quite distinct from Brownian movement. For this reason they are probably not broken-off fragments of adult plasmodia exuded through pressure on the swollen blood corpuscle. They probably represent some kind of motile microgamete. Care should be taken not to confound their motion with that of granular débris set up by currents caused by varying degrees of pressure on the cover-slip.

The second kind is the well-known flagellated body. Out of a consecutive series of over 200 cases I only observed it six times (or rather in six cases) in blood the plasma, and when it encounters a red blood corpuscle generally attaches itself by one extremity to it. Sometimes, as if dissatisfied with its reception, it breaks off again and once more locomotes, apparently seeking for its macrogamete.

seeking for its macrogamete.

More rarely the flagella may be seen attached to their parent parasite as in Case 151, fig. 4. Usually, however, what is noticed is one or two flagella projecting from the periphery of a red blood corpusele. In fresh specimens the whip-like movements of the flagellum may violently agitate the corpusele. In stained specimens the flagella seem to spring from the extreme periphery of the corpusele; see fig. 4, Case 106, which are copied drawings of specimens under a magnifying power of 1100 (Oc. 3, O·1 1/12 lengthened tube).

I only noticed the presence of crescents in three out of over 200 cases, and even these I was not certain of. At first I put this down to faulty technique, but continued observation showed the same anomaly, and therefore I was interested to read in a paper by Plehn (Physician of the German Government in Cameroons), translated in the JOURNAL OF TROPICAL MEDICINE.



drawn direct from the body and examined at once. The statement in the ninth edition (1900) of Green's "Pathology," that "flagellated organisms are never found until the blood has been withdrawn for about a quarter of an hour" is quite incorrect. The very first case in which I saw it (not one of the series mentioned above), that of an anæmic and emanciated child, on making a fresh specimen and examining at once, the whole field seemed to be full of a mass of waving and lashing flagella coming from nearly every corpuscle. It reminded me of the rippling effect produced by the wind passing over a cornfield. The child was desperately ill and died the same night. Careful examination in similar cases has failed to detect any "crescent" bodies which could have been transformed into the flagellated bodies. On the other hand, the flagella generally seem to spring in pairs from unaltered red blood corpuscles. However, this may be merely due to the curious adhesive property of the free flagella.

Nothing is more interesting than to watch the progress of a free flagellum; it makes its way through

January, 1900: "The half-moon forms (crescents) of the malarial parasite which alone are supposed to be capable of transmission are in Cameroon extremely rare; in fact they occur quite isolated and are not to be found during many of the worst fever months. I saw, during almost four years in Cameroon, but once flagellated forms." And again, in a paper by Dr. Hans Zieman, Staff Surgeon, Victoria: "I thought with longing and secret envy of the material at the disposal of the Italian investigators whose patients often had masses of crescents in their blood. Out of more than 1000 examinations of blood I could only detect on twelve occasions isolated crescents" (translated in the Journal of Tropical Medicine, January, 1901). Probably the immediate ancestor of the flagellated body is a spherical, and not a crescent-shaped body.

## KARYOCHROMATOPHILES

Karyochromatophiles, or primitive bodies, was the name given by Plehn to certain very small bodies which eagerly absorbed nuclear stains (JOURNAL OF TROPICAL MEDICINE, December, 1900, and January,

1901), and which he regarded as the cause of the severe afebrile anæmia met with in the tropics, and the precursors of the plasmodia, enabling the latter to exist during the long latent periods during which no febrile manifestations are seen, but which on suitable provocation, e.g., chills, over-fatigue, &c., are terminated by an explosion of fever. This view has much to recommend it, and I have on several occasions noticed very small granules, stained by methylene blue, in red blood corpuscles in people liable to fever, though not actually in an attack. More evidence is needed, however, as to their presence and development; I believe I have seen all stages between this form, which may be regarded as the smallest form of a plasmodium, and the adult parasite.

## PRESENCE OF FREE MELANIN IN THE BLOOD.

Davidson states (p. 114) that "for purposes of classification, the presence or absence of melanæmia may be taken as pathognomonic of malarial fever." Other observers have pointed out that this is not strictly true, melanin being found free in other diseases. Here I would only lay stress on a fact that I do not remember seeing mentioned by anyone, viz., that in the blood of new-born infants, and for some little time after their birth, granules of hæmoglobin or pigment, indistinguishable from that manufactured by the parasites, may be found in considerable quantity, both free and intracellular. Possibly this is connected with the icterus neonatorum.

#### LEUCOCYTES IN MALARIAL BLOOD.

The various proportions of the different varieties of leucocytes met with in fever, and the changes they undergo during the chill, hot and sweating stages is a most interesting subject, and one my attention was directed to by reading the Report of the Government Commission on Fever in Nyassaland. I have no definite statistics to offer on this point, but it is one I hope to carefully examine later on. Meanwhile the impression left on me by a large number of observations is as follows: Marked leucocytosis in fever is rare, and probably never occurs without some secondary complication, e.g., pneumonia. I only remember seeing it two or three times in my series of cases. As a rule, the lymphocytes are not largely increased in number. There is, however, probably an increase in the finely granular oxyphile (polymerous nuclear) cells, this latter is the chief phagocytic agent as regards the parasites, I think the number present of this latter kind of leucocyte may be of value to a certain extent in forming a prognosis. If they are numerous the reacting power of the patient is probably good, and phagocytosis will make an end of his parasites. In mild cases of fever the attack often rapidly ceases by an auto-curative action. Eosinophilous cells are not apparently increased in number.

## MORBID ANATOMY.

Here I have nothing fresh to add to the well-known facts recorded by others. The enlarged and pulpy spleen, the softened and frequently enlarged liver, and the deep melanosis exhibited by both these organs are very striking objects. I should like to lay emphasis on the frequency with which adhesions are found, especially on the diaphragmatic surfaces of both

spleen and liver. There can be no doubt that the congestion of these organs, always present to a greater or less extent, lends itself very readily to an inflammation of the covering peritoneum and accounts for the severe pain so often complained of during the course of the attack. In the comparatively small number of post-mortem examinations I have been permitted to make by the relatives of the cadavers, I have not noticed any changes in the kidneys. Smears taken from spleen and liver usually show the presence of parasites, but by no means abundantly so, if the patient has been well cinchonised before death.

#### INCUBATION.

From the practical side this is of comparatively slight importance. I suppose one never sees a native in a primary attack, unless indeed two babies, aged 4 and 5 days respectively, in whose blood I found the plasmodia and who presented the clinical features of fever, were instances of such. Europeans as a rule enjoy immunity for the first few months of residence, but the opportunities of infection are so numerous, and the Anopheles mosquito so ubiquitous, that it is exceedingly difficult to judge. I have often noted, however, that first attacks come a few days after crossing the Lake, the papyrus-fringed shores of which are grand breeding places for mosquitoes. The first attack seems to be usually a benign tertian, but on at least two occasions I have seen a rather severe irregular remittent yielding only very slowly to quinine. Once fever has manifested itself many different causes will bring about a recurrence within twenty-four hours of the exciting cause, e.g., a chill, over-fatigue, undue exposure to the sun, &c.

#### GENERAL SYMPTOMS.

Pursuant to the course described above I shall not attempt to describe the classical symptoms of the intermittent form. In the rapidity of the onset, the rigor, cold, hot and sweating stages, they exactly correspond to the well-known descriptions given in all the text-books. This form is distinctly uncommon amongst natives, and not very common amongst Europeans. Proceeding then at once to the ordinary remittent type of fever which forms the immense bulk of all cases seen in our hospital practice, I find that out of over 400 cases, the mode of origin, whether by rigor or not, is noted in 109 cases. Of these 59, or 54 per cent., started with a rigor; as the native expression for this merely means "to shake," probably chilly feelings were often felt in the remaining 46 per Personal experience confirms the fact that rigors are an exception, sensations of cold or chilliness being usually felt. Yawning and stretching of the limbs frequently herald an attack, though at the time the thermometer may register a normal temperature. Severe prefebrile headache is uncommon, though a dull aching headache may be complained of. Diarrhea, contrary to what is often stated in the textbooks, is an exceedingly frequent concomitant. Out of 121 cases in which this condition was inquired into, the high proportion of 35 per cent. (43 cases) was found in which this condition heralded an attack.

One gentleman possessed of great observing powers told me he always knew when he was in for an attack of fever by the smarting sensation caused by micturition, a premonitory sign he found to be infallible. Very heavy sleep, almost amounting to torpor, has been noted by some as one of the earliest symptoms, or strange to say on the first day of actual fever.

The skin is usually dry; a good sweating at the remission is distinctly favourable. More often only a slight moisture is perceived. The conjunctive are often inflamed and severe photophobia may be present. This is often well marked in Europeans. Jaundice is best recognised in the conjunctive of the natives; it is only common in the bilious remittent type and in black-water fever. In 232 cases, where this complication was specially looked for, it was only noted in 10 cases (4 per cent.), of which, however, three died. Severe jaundice is certainly a serious complication, slight jaundice is of no moment.

The pupils are usually moderately dilated.

The tongue is heavily coated with a white fur in the early stages, later on it becomes dry, brown, and markedly tremulous as the patient passes into a typhoid condition. This latter condition is, however, rare, unless the patient has been for long untreated before being brought to the hospital. In this case the teeth become covered with sordes, and subsultus tendinum or carphology may be present, with a low, muttering delirium.

Anæmia is always present and may be very marked, even after one attack. It is more fully referred to

under the head of complications.

#### PYREXIA.

In the commonest form of African fever met with in Uganda, the temperature shows an irregular remittent curve. Often this shows tertian exacerbations. It is frequently very resistant to quinine, the temperature taking from four to ten days to reach the normal line.

Out of 227 temperature charts 178 (79 per cent.) were found to possess this kind of curve. The pyrexia is of the following types:—

(1) Simple tertian intermittent. Common.

- (2) Double tertian intermittent (quotidian). Not very common.
  - (3) Quartan intermittent. Rare.

(4) Remittent tertian. Very common.

(5) Remittent quotidian. Not very common.

(6) A quite irregular chart. Very common.

Experience shows that the last is most difficult to deal with as it is often very resistant to the action of quinine. Associated with the first three types are the large pigmented plasmodia which sporulate in the peripheral blood. Associated with the last three are the much smaller less pigmented parasites. asexual forms only sporulate sparsely in the peripheral circulation. The histology of the parasite has been described already. In the last type the behaviour of the temperature to quinine may show a regular drop from evening to evening till the normal line is reached. In less malignant attacks a resolution by crisis may take place. I have again and again seen the temperature drop 7.8, or nearly 10 degrees, in one night after a single large of quinine. In these cases, even if the quinine be discontinued, the temperature does not rise again.

A very common complaint is that of fugacious pains, which may be so severe at times as to evoke cries of distress from the sufferer. I have had several times to give morphia hypodermically for this. The seat of the pain seems to be most frequently in the back, loins, or the bones of the legs or arms. It is probably due to a slight neuritis, and seems to have no connection with the kidneys. Quite distinct from this is præcordial distress due to over-action of the heart, especially when the patient is walking about when he should be in bed, and the great tenderness often complained of in the right hypochondriac, epigastric and left hypochondriac regions; the pain in the first two regions is due to a congested and tender liver, in the last to an engorged spleen or to perisplenitis.

In remittent fever the pulse which is at first hard and full, has a very forcible beat, which may cause complaints of a throbbing headache from the patient; later on it becomes progressively softer, weaker, and more dicrotic, finally becoming rapid, small, and irregular, with very low tension. I have been sometimes surprised, however, to notice how regular and comparatively strong the pulse has been within a few

minutes of death.

#### THE RESPIRATION.

The respiration is only hurried in proportion to the height of the temperature. Of course co-existent splenitis, pneumonia, or bronchitis may cause profound alteration in the respiration rate. With the exception of initial diarrhoea, which, as has been pointed out, is very common, the bowels tend to be constipated throughout. Profuse diarrhea would make me suspicious of typhoid or dysentery. A watery diarrhœa with collapse, the so-called algid symptom in pernicious fever, is not uncommon, especially in infants. It yields very readily to quinine in full doses, with some astringent added. Herpes, though met with, is uncommon. Initial epistaxis is common. This symptom is also met with in malarial cachectics suffering from enlarged spleens. malarial ulcers described so graphically by Dr. Cross in the Journal of Tropical Medicine, November, 1900, I have never seen, though I have seen thousands of cases of ulcers in natives, and many of these doubtless have malarial attacks from time to time, which impedes the natural function of repair. Some of the appearances he describes seem to me to be characteristic of oriental sore. Malarial scurvy as described in cases occurring in India I have never come across, though phagedæna of the gums in syphilitic cases and fever may occur together.

As regards cerebral symptoms these are met with in all degrees, from the dull, throbbing headache to the fulminating attacks of coma which may kill a strong man in a few hours. Delirium is common, especially at night. Active maniacal delirium is fortunately rare. Cerebral irritation is frequently met with in the graver types of irregular remittent fever. The patient lies in a condition of general flexion on his side, and if aroused answers irritably, if at all. He refuses food and medicine, and violently resents changes of posture or attempts to open his

closed lids.

Coma is a serious though by no means fatal condi-

tion. A patient with wide-open, staring eyes, fixed pupils, and stertorous breathing, quite incapable of understanding anything said to him, may yet recover rapidly under the influence of a large dose of quinine

administered hypodermically.

In the bilious remittent form the patient vomits freely a quantity of green bile, and is usually deeply jaundiced, as shown by the deep yellow conjunctive and ochreous skin (if a European), pale stools and presence of bile colouring matters in the urine. This form of fever is dangerous unless taken in hand early.

On reviewing the clinical types presented by several

hundred cases one would arrange them thus :-

(1) Intermittent fever.

(2) Remittent.

a Mild

b. Severe

Gastric type Bilious remittent.

Comatose Dysenteric Syncopal

c. Pernicious

Adynamic Algid Hyperpyrexial.

(3) Hæmoglobinuric.

The chief characteristic of each type is sufficiently shown by the title. The commonest forms of pernicious fever in Uganda are the comatose, syncopal and

dysenteric.

The vexed question as to whether hæmoglobinuric fever, or black-water fever as it is universally called here, should be included among the malarial fevers, may be briefly discussed. The floods of papers that have appeared on the subject cannot be said so far to have definitely settled it. A few preliminary statements may first be given to clear the ground. As met with out here, it is not due, with all due regard to R. Koch, to the abuse of quinine.

Though rarely met with amongst natives I have yet met with two cases of it amongst them. They are said to suffer less than Europeans when attacked, and

my two cases both bear this out.

It differs from malarial fever in one notable point. Quinine has not a specific influence upon it. Ordinary attacks of malarial fever seem always to precede it. Though commonest in the second or third year of residence in the country, it may be met with for the first time in a person who has been in Africa for many years. Thus one Englishman fell ill of it here in his twelfth year of residence. When it has once attacked

a person, he is very liable to relapses.

Space only permits a very brief description. The typical attack is ushered in by premonitory feelings of malaise; a single prolonged rigor forces the patient to bed, if he is not there already, and with shaking hands he heaps the blankets over him. A sensation of burning heat follows, with, it may be, sharp pains in the loins. If a stranger to this fever, on passing water he will be startled to see it the colour of porter, or it may be blood-red or like port wine. Jaundice and most distressing vomiting quickly set in, everything being rejected, with usually bilious vomiting. The secretion of the kidneys gets much less, and intractable insomnia is usually a marked feature. Severe anæmia rapidly develops and a loud hæmic murmur may be heard all over the cardiac area.

Muscular prostration becomes intense, the pulse flags, and an anxious expression becomes stamped on the countenance. At this stage improvement may set in and the patient recover, the urine becoming more abundant, the vomiting ceasing, and the jaundice diminishing. He will remain weak and anæmic for long, however; or a fatal issue may rapidly supervene. The urine may become clear again before the last, or suppression may occur, only a few drops being drawn off by the catheter, and these becoming solid on boiling. Repeated rigors may occur. Sudden syncope may abruptly cut the thread of life short.

Our European who had had several attacks told me he could always tell when he was passing black-water urine, even in the dark, by the noiseless manner in which micturition took place in the chamber (probably due to the highly albuminous character of the urine).

As regards the presence of parasites in the blood it must be remembered that the disease occurs generally amongst Europeans, that one is usually summoned long distances to see the patient, and on arrival he is pretty well cinchonised. In one case in which I got some good preparations of blood I found no parasites; but the patient had taken large doses of quinine.

In a great many cases of fever the spleen may easily be felt below the ribs in the left hypochondrium. The large notch in its anterior surface, its movements with respiration, the dull percussion note over it when large enough to approach the abdominal wall, all serve to verify it. In slight attacks it covers its former volume almost completely after the fever has passed away, and it is interesting to follow with the hand its diminishing size, day by day, till it becomes lost once more beneath the ribs. In frequently occurring attacks a species of hyperplasia sets in and the organ remains permanently enlarged. In some cases this enlargement is immense, the organ filling two-thirds of the abdominal cavity and occupying the epigastric, left hypochondric, left lumbar, left iliac, hypogastric, umbilical, and right iliac regions. In these cases it may feel almost of stony hardness, and may be quite insensitive to pressure. In some cases it is associated with ascites. Out of 280 cases in which the condition of this organ was specially noted, it was found enlarged in 127 (45.3 per cent.). Of course an enlargement sufficient to be felt below the ribs must be very considerable.

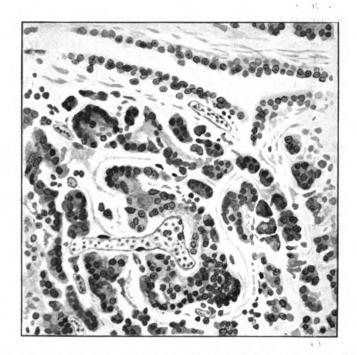
Similarly the liver was felt to be enlarged in 17 cases out of 235, a low percentage of 7.2. Congestion of the liver not leading to any enlargement that can

be detected by palpation was very common.

As regards albuminuria in malarial fever, out of 91 cases in which albumin was tested for, it was found in 66 cases (72.5 per cent.). This includes cases in which only a slight amount was detected. A large amount was rare, but did not add materially to the gravity of the prognosis.

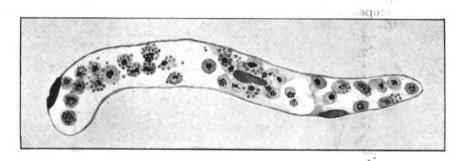
RECURRENCES OR RELAPSES.

These are very frequent. In untreated cases in which the fever spontaneously subsides, attacks are very liable to recur about a week from the subsidence of the last attack. In women, the catamenia is a time in which attacks are very common, and some European ladies seem to get an attack every monthly period.



I.—SECTION OF PANCREAS, SHOWING CAPILLARIES FULL OF PARASITES.

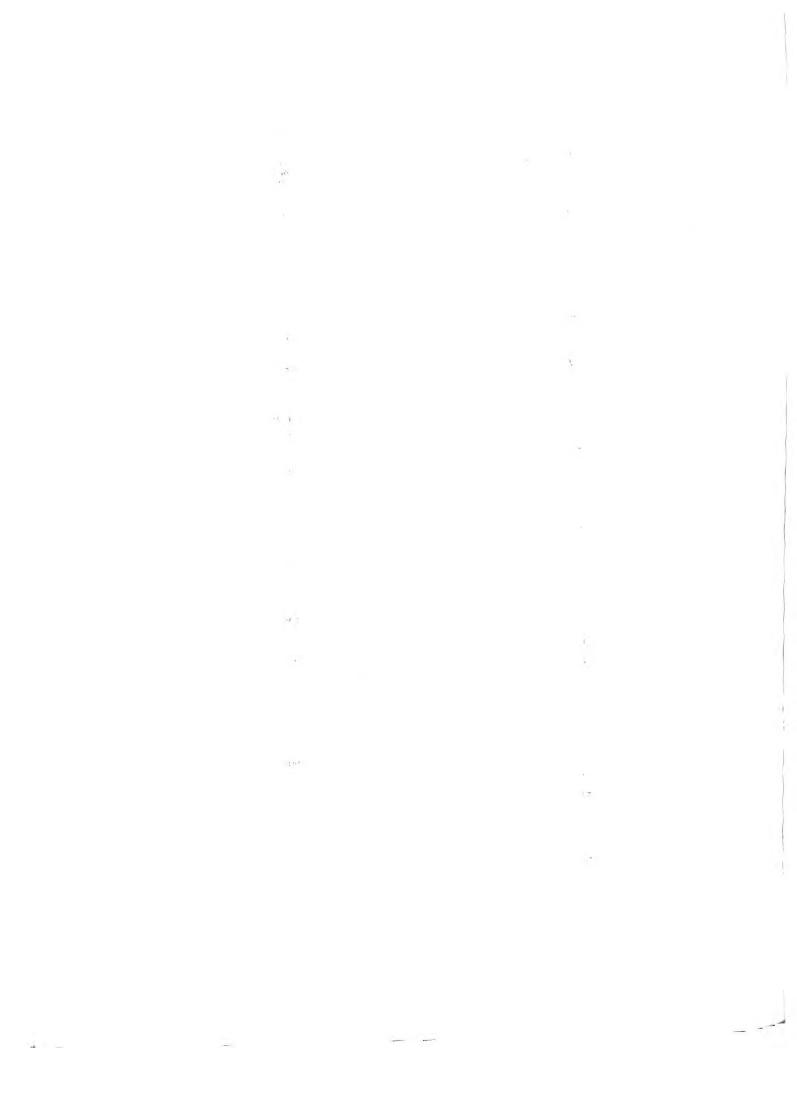
In the upper part is a pancreatic duct.



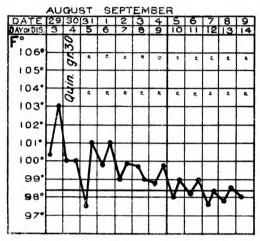
II.—OBLIQUE LONGITUDINAL SECTION OF SINGLE CAPILLARY, SHOWING PARASITES IN VARIOUS STAGES.

Enlarged from No. 1.

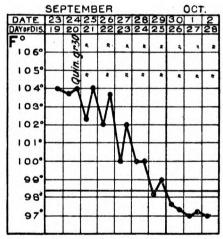
To illustrate the paper on "Hemorrhagic Pancreatitis in Acute Malaria," by W. G. Ross, M.D., and C. W. Daniels, M.B., London School of Tropical Medicine.



Another interesting point in connection with the more obstinate infections, and one that I have observed over and over again, is that in a patient whose temperature has dropped to normal under the influence of large doses of quinine, fresh attacks may take place, being ushered in by a rigor and sudden rise of temperature.



CHART, SHOWING GRADUAL REDUCTION OF TEMPERATURE UNDER QUININE.



A SIMILAR CHART.

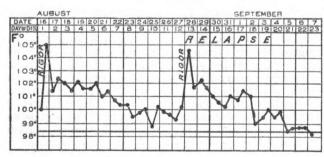


CHART OF-BLACKWATER FEVER.

I have found that after a severe attack has been cured, prophylactic doses of ten grains of quinine daily

are not sufficient in all cases to prevent relapses; nothing is more disappointing in such cases than to see after the lapse of seven to ten days the temperature run up again and a rigor take place. If, however, the patient has been free of fever for some weeks, much smaller doses, three to five grains, are sufficient to prevent recurrences. When once a person has become, as it were, saturated with the malarial poison, any little cause that lowers his vitality may cause a relapse, though the prompt use of quinine may ward such off. The commonest cause is a chill either from sitting in a draught when perspiring, or from getting wet feet, or exposure to a strong wind; next to this, perhaps, comes over-fatigue, the presence of another illness, undue exposure to the sun, &c.

Traumatic injuries are not nearly so likely to bring on an attack of fever. In treating upwards of 150 cases of bullet wounds I cannot remember any cases of malarial disease breaking out amongst them as a direct consequence of the injury. Quinine taken even during the premonitory symptoms of an attack seems often to abort the succeeding rise of temperature.

### COURSE AND TERMINATION.

The usual result of an attack of fever when taken early and suitably treated with quinine, is prompt defervescence of the fever and rapid convalescence. Remittent fever yields less readily than intermittent, but it is surprising how often even a chronic infection yields to quinine, the temperature curve steadily sinking day by day, till in three to five days the normal line has been reached. Occasionally, however, even when quinine is given early and in adequate doses, the temperature keeps up for an unduly long time.

## FATAL TERMINATION.

Cases coming early under treatment very rarely fall into a typhoid state. Pernicious symptoms may spring up, a comatose or algid state may supervene, or the life may be cut short by syncope or pneumonia, or other serious complications, but in my experience the illness seldom becomes chronic.

One arrived in Africa with an a priori belief that malarial fever was a comparatively harmless disease to natives, and that death seldom ensued from it. Accurate statistics completely negative this pleasant idea. From May, 1897, to July, 1901, 456 cases of fever were admitted into the Mengo Hospital, of which 54 died, giving a mortality of 11.8 per cent. Of course some were brought in in a moribund condition and others practically starved from suitable food, but even subtracting 18 deaths which occurred within forty-eight hours of admission, the corrected death-rate stands at 8 per cent. Very different is this to the assertion made so lightly that fever is a comparatively innocuous disease to the native of Africa. Amongst these 53 deaths I find the following immediate causes are represented:—

	Cases.		No. of Cases.
Syncope and collapse	5	Anæmia and marasmus	3
Meningitis	4	Intense plasmodial infe	ction 3
Coma	4	Delirium	2
Associated typhoid	4	Gangrene	1
Jaundice	4	Epilepsy	1
Dysentery	4	Bronchitis	1

DIAGNOSIS.

This has been much simplified by discovery of the plasmodium malariæ. If definitely found, whatever else may be there, malarial infection is certainly present. Conversely, if repeated examinations show its absence it may be confidently excluded from the diagnosis.

It must, however, be remembered that the parasites may be found in the blood even in considerable numbers without any clinical manifestations of fever. I have many times found them in the blood of young native children who exhibited none of the usual signs of fever. Also merely finding the plasmodium does not necessarily prove that the patient is not suffering from a mixed infection. Nor is this wonderful when we remember how prone any disturbance is to light up any old malarial infection. I have found the parasite of malarial fever in the blood in cases of typhoid, pneumonia, small-pox, bronchitis, filariasis, sleeping sickness, appendicitis, and dysentery, thus showing a double or mixed infection.

## TYPHOID FEVER.

The first four years of my stay in Uganda, though suspecting the presence of typhoid fever in the country I could not definitely prove its existence. of this, of course, lay in the extreme difficulty in a semi-civilised country of obtaining permission for post-mortem examination, the natives accusing us of wishing to eat the heart, &c., of the cadaver. ever, tact and increasing intelligence in the people are gradually leading to a much better state of affairs. Another difficulty has been the demands of an exceedingly busy hospital practice on a very slender staff, so that it not unfrequently happened that when the looked for opportunity came lack of time rendered only a partial examination possible.

No other medical men whom I met up here could give me positive information, and the Government P.M.O. only a few months ago told me that he had never come across a case. From time to time we had cases in the hospital whose clinical course resembled that of typhoid, but as unfortunately at present Widal's serum test had been quite impracticable, one could not be positive. In the light of subsequent discovery it was seen that there must have been a fair number of cases of typhoid, though the temperature charts in some were modified by co-existent

malaria.

On February 21st, 1901, a woman was admitted suffering from malarial infection, as proved by the detection of the parasites on a blood examination. spite of the usual treatment she got worse, and miscarried on February 23rd; on February 25th acute peritonitis set in, with intense tympanitis, &c. I did a laparotomy and found signs of commencing peritonitis with thick lymph on one coil, but did not notice any perforation. Much purulent fluid was got rid of by repeated flushings of the peritoneal cavity and the

abdomen sewn up. The patient died two days after.
On April 2nd, 1901, a man was admitted, greatly exhausted, with a high temperature. A film of blood showed an intense infection of large pigmented plasmodia belonging to the tertian variety; the type of fever was quotidian. Quinine was freely given, and blood preparations showed the rapid diminution of the parasites. His temperature continued high, however, and on April 11th he died. Of course he had arrived in a very bad condition from want of food. Exigencies of work only allowed a partial post mortem. were taken from the liver and spleen, and it was noticed that the mesenteric glands were much enlarged.

On examining the smears, besides the usual appearances of a case of fatal malaria, the spleen smear was crowded with bacilli, which examined under in. oil immersion and No. 5 eye-piece appeared morphologically identical with Eberth's typhoid bacillus.

(To be continued.)

# PLAGUE.

### PREVALENCE OF THE DISEASE.

India.—The plague returns for the week ending January 18th show, 9,204 deaths against 10,368 in the week preceding. The principal figures are: Bombay districts, 3,510 against 4,797; Punjab, 2,379 against 2,662; Mysore State, 653 against 636; Madras Presidency, 590 against 586; North-West Provinces and Oudh, 829 against 685; Bengal, 593 against 462; Kashmir (Jammu), 257 against 192. In Bombay city, during the weeks ending January 11th and 18th, the plague deaths numbered 234 and 296 respectively.

EGYPT .- During the weeks ending January 25th and February 1st, the number of fresh cases of plague reported in Egypt were 15 and 22, and during the same periods the deaths from the disease numbered 16 in each week. The disease is well-nigh confined to the city of Tantah, but cases have also been reported at Aboukir in the Mehalla district, at Kafr Enan, near Zifteh, and at the village of Koum-el-Nour, near Mit

Ghamr.

CAPE OF GOOD HOPE .- During the weeks ending January 11th and 18th respectively, the number of fresh plague cases in the Cape numbered 3 and 2. There were no deaths from plague during either week.

MAURITIUS.—During the weeks ending January 30th and Febuary 6th, the fresh cases of plague in Mauritius reported amounted to 12 and 13 respectively; during the same periods the deaths from the disease numbered 9 and 8 respectively.

NEPHRITIS IN MALARIA.-Moore gives the conclusions of his paper in the following: (1) Nephritis is not likely to occur in a single tertian infection for a short interval, say of five days; (2) a double tertian infection will produce a nephritis in a large percentage of cases if it runs only for a short time. Our percentage is 80 per cent., but I think this is too large; (3) the more chronic the case becomes of any infection the more likely to produce nephritis; (4) malaria of long duration, or often repeated attacks, will produce chronic renal disease, as shown by continuous presence of albumin and casts; (5) æstivo-autumnal malaria probably gives the greatest percentage of cases of nephritis-68.7 per cent; (6) the age of the patient, height of temperature, or specific gravity of the urine showed no relation to the presence of albumin and casts in our cases .- American Medicine, Philadelphia, December 28th, 1901.

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THE

# Journal of Tropical Medicine

FEBRUARY 15, 1902.

# THE MEDICAL SERVICE OF THE ROYAL NAVY.

At the present moment, when radical changes are being introduced in the medical services of the Army, Militia, and Volunteers, and also in the Colonial Medical Service, we are not without apprehension that the medical service of the Navy may be neglected. We have frequently expressed regret that the surgeons of the Navy contributed so little to the medical journals, but this, as we have explained previously, is owing not to want of ability or interest in their work, but to the cumbrous nature of the means of transmission the medical, in common with all, officers of the Navy are subjected to. We have received from time to time, from surgeons of the Royal Navy, important and valuable papers, forwarded by the courtesy of the Director-General. We should like to see our professional brethren

in the Navy freed of this roundabout way of communicating their observations, and placed on the same footing as, say, the officers in the Indian Medical Service. The surgeons of the British Navy have unique opportunities of observing disease in many climates, and as pioneers and scouts in the van of tropical medicine their experiences would be of immense value to medi-We hope to see this incubus removed at no distant date, and we are sure that the authorities at the Admiralty, were the matter placed properly before them, would grant the permission we suggest.

For yet another reason would we wish to see more freedom given them to express their opinions. The medical officers of the Navy have been in much the same position as regards position, leave, pay and allowances, for many decades, and it is impossible for naval officers to raise their voices in their own behalf. The discipline of the Service is such that a murmur of discontent is almost unknown.

The medical service of the Navy is not composed of "sea lawyers" by any means; on the contrary, the medical officers of the Navy err, if they err at all, by being but too well satisfied with what, to the outside members of the profession, appears unsatisfactory in many respects. They are loyal to their Service and jealous of its reputation; but their silence on many occasionscompulsory it may be-is not always to the best interests of the Navy.

The sister medical service in the Army is ever on the qui vive to better its position and to improve the hygienic conditions of the soldier. Better terms are from time to time bestowed on the military surgeon, in consequence of a form of agitation which in the Navy is impossible. This is not quite as it should be, and unless the Admiralty bestir themselves, they may find their Medical Department neglected and the services of medical men difficult to obtain. a scheme is being prepared by the Admiralty to redress the various "grievances" of the Medical Department of the Navy. Unless this is done effectually and considerately, the Naval Medical Service will fall behind in its competition with the R.A.M.C., with the result that it will not only be difficult to secure good men for the Service, but even to secure medical men for the Navy at all.

The grievances, if they may be so designated, are several: (1) The present rate of pay is relatively below what is granted to the R.A.M.C. officers, and is less amongst newly-joined officers than is now-a-days earned by recently-qualified medical men in civil practice. (2) The pension of £1 a day would appear satisfactory, but instead of the increments of pension being obtainable only after three or four years' periods of additional service, it would be better were the pension increased by one shilling a day for each year's service after the twenty years' service has been completed. (3) Sending a fleet-surgeon, after twenty-five or more years' service, to sea in any but a flag-ship, would appear to be not only inexpedient but wholly unnecessary, the work in ships, other than flag-ships, being quite within the scope of work of surgeons of a lower rank. (4) A real grievance seems to be that the flag allowance of second flag-ships, and in the flag-ships of the home ports, is not granted to the Medical Department, though all heads of other departments get it during the time the Admiral's flag is flying. We have no doubt that the Admiralty will remove what appears an injustice to the Medical Service of the Navy in their new warrant. (5) Allowance of time and pay for study-leave must be granted sooner or later, unless the medical men of the Navy are to fall behind in the matter of recent surgical and medical knowledge.

We are so proud of our Navy that we would grudgingly see the Medical Service of the Navy starved by neglect; and it behoves the civil members of the profession to write and speak for this branch of the profession, the members of which are wholly debarred from writing or speaking for themselves.

School of Tropical Medicine in Portugal.—It is proposed to establish a colonial hospital and a school of tropical diseases in Lisbon. There are to be three chairs created, namely, tropical pathology and clinical medicine, tropical hygiene and climatology, and tropical bacteriology and parantology.

# Correspondence.

To the Editor of the Journal of Tropical Medicine.

DEAR SIR,—Your Editorial in the JOURNAL OF TROPICAL MEDICINE for December 2nd, 1901, is most opportune. Anyone who knows the life on the west coast of Africa will admit that after even fifteen years' service there, there would be few candidates for pension.

Nothing can attract men into a service where one never knows but that within a few days one may be lying rotting in an almost forgotten grave.

Pecuniary advantages, leave of absence, hope of rapid promotion, transfer to a healthier climate, good pension coming quickly, better dwellings, less ordering about, may all cause a better class of man to come forward to fill

vacancies.

At present, in places, it is hard to fill vacancies with any sort of man, and the Service is consequently not only greatly undermanned, but often men coming out are found to be such weeds that they are quickly sent home again, costing the Government a good deal of annoyance and expense. Often, especially in coastal towns, men are chosen to fill the stations because they can do administrative work. This to no small extent, hinders them in their own work, and a medical man, as a rule, does not relish sitting in court trying cases.

As most men come out here to make as much cash as possible in as short a time as possible, it is only fair that they should be well paid for these extra duties, but unfortunately, they merely get about enough extra pay as to pay

their servants for the year.

Minor inconveniences could be mentioned by the score, and I am sure that this Service must be dealt with in a very liberal fashion before the Colonial Office can get any way suitable men to select from, and not men who are no use, nor men who only wish to make enough money to set up at home.

Yours, &c., VERITAS.

# Rews and Aotes.

Beri-beri on board a British Man-of-War.— His Majesty's cruiser *Pomone*, 2,135 tons, under the command of Captain E. A. Simons, arrived in Bombay from Muscat, having left that port on January 16th. On arrival in Bombay there were 35 cases of beri-beri on board. Eleven, including Lieutenant G. B. Hadd, were landed and removed to the St. George's Hospital, and the rest were removed to the Military Hospital, Colaba, last evening. The *Pomone* was sent to the Government Dock the crew to the Sailor's Home, and the vessel was thoroughly disinfected.

"A Mosquito-catching Plant.—Such a plant is much needed in India generally and in Calcutta especially. The plant to which the Americans have applied this name is known scientifically as Vincetoxicum acuminatum. It is a beautiful hardy herbaceous perennial from Japan. It is in full flower at the very beginning of summer, at which time it is one of the showiest things in the garden, and con-

tinues in bloom for several weeks. It grows to a height of from one to two feet, a clump of slender stems enveloped in a cloud of star-shaped, creamy white flowers which are borne in short cymes. The plant belongs to the Milkweed family and its flowers secrete a viscid substance that attracts insects and especially mosquitoes. Once these insects alight upon the flowers and plunge their "beaks" into the tempting sweet, they are hopelessly entrapped. No matter how frantically they struggle they cannot release themselves."

In amplification of the above it may be stated that the plant belongs to the natural order Asclepiadaceæ, and would probably thrive in India, as many genera of this Order are natives of this country. Any way,

an experiment might be tried with it.

H. St. John Jackson. Editor, Indian Gardening and Planting. Times of India.

# Current Miterature.

Papers in the British Medical Journal of January 25, on Tropical Diseases.

III.—On the Causal Relationship between "Ground-Itch," or "Pani-Ghao," and the Presence of the Larvæ of the Ankylostoma Duodenale in the Soil. By Charles A. Bentley, M.B., C.M.Edin.

Medical Officer to the Empire of India and Ceylon Tea Company, Limited, Borjulie, Tezpur, Assam.

In the Journal of Tropical Medicine for March 1st, 1901, an article appeared under the heading "Water-Itch, or Sore Feet of Coolies," describing a disease with which all tea garden medical officers in Assam, Cachar, and Sylhet, are familiar. Apparently a similar affection is very prevalent on the sugar plantations of the West Indies, for in the Annual Report, by the Surgeon-General of Trinidad, for the year 1900, it is mentioned that "ground-itch is very prevalent during the rainy season on the sugar plantations, amongst the East Indian labourers." It is further remarked in this report, that although the disease is not a serious one, it is a matter of great importance to the planters, on account of the number of labourers it incapacitates from work.

The disease has been defined by Dr. Dalgetty (Sylhet), one of the writers referred to, as "A superficial vesicular dermatitis, which occurs epidemically among the coolies working on tea gardens during the wet months of the year, which solely attacks the feet, and which has a considerable resemblance to ordinary scabies." In place of this definition I substitute one which I think is perhaps more suited to the condition.

# DEFINITIONS.

Ground-itch (synonyms: pani-ghao, water-itch, water-pox, water-sores, sore feet of coolies) is an affection of the skin confined entirely to the lower extremities, and probably always associated with the presence of the larvæ of the ankylostoma duodenale in the soil of the affected areas; endemic in Assam and the West

Indies, and possibly present in other parts of the tropics; characterised by its periodical epidemic appearance in the infected areas, coincident with the onset of the rainy season; with typical lesion consisting in a primary erythema, followed by a vesicular eruption which frequently becomes pustular, and in severe cases may result in obstinate ulceration, or even in gangrene.

PREVALENCE.

In Assam the disease is almost universally known by the name "pani-ghao" (literally, water-sore), a term which has been applied to it probably because it only occurs during the seasonal rains, when the earth is saturated with moisture. On tea gardens, where the disease has once appeared, it becomes a yearly recurring epidemic. Sporadic cases may occur as early as May, but the general outbreak does not usually appear until a month or six weeks later, and does not disappear until about the end of October, when the ground has become comparatively dry again. People of all classes are liable to contract the disease, although it is rare for a European to be attacked.

The disease may generally be said to attack the different individuals in a community with a frequency directly proportionate to their exposure to the source of infection. All observations point to the earth as being the infecting medium, and fæcal contamination of the soil as being the most active agency in the propagation of the disease, which in over 90 per cent. of cases is contracted in the immediate neighbourhood of the coolie lines, as the collection of coolie houses is termed.

It is a well-known fact that the Indian coolie is not very particular in regard to the disposal of human refuse. He will not adopt any proper conservancy system, and latrines, if erected on tea gardens, are never used by the labour force. The coolie walks but a few yards from his dwelling in order to relieve himself. In this way the cultivated areas for some distance round the lines in most tea gardens is constantly being contaminated with fæcal matter. The coolies themselves recognise that this accumulation of filth is the cause of the disease, and as far as possible they try to avoid exposure to infection by shirking work in the parts of the garden in close proximity to the lines. When obliged to walk over the infected soil they almost invariably protect their feet by wearing "kurrams," a kind of wooden sandal.

In this part of Assam the disease appears chiefly among the labourers who are engaged in hoeing; it affects the strong and healthy quite as frequently as the weakly and anæmic. Cases occurring among hoeing people almost always show the eruption on the instep and ankle. This is no doubt due to the nature of their work, which necessitates their remaining near the same spot for a considerable time, and ensures that their feet are in contact with the soil, while a constant shower of moist earth falls from the hoe upon their feet and ankles. Of the total cases, 75 per cent. occur among men. This is explained by the fact that during the time when the disease is prevalent, the strong men are engaged in hoeing, while the more weakly men, the women, and children are at work

plucking.

Among pluckers, the disease is very much more frequently seen on weakly individuals and those whose caste customs forbid a high standard of personal cleanliness. Among this class of coolie the lesion is almost always confined to the underside of the foot or to the clefts between the toes, and can generally be traced to neglect to wear kurrams, or to want of sufficient care in cleansing the feet after return from Want of cleanliness may certainly be regarded as a strongly predisposing cause of infection, and this fact rather than any inherent susceptibility must be looked upon as the reason why anæmic and debilitated coolies so frequently suffer from the disease. The reason that so few robust plucking people are subject to the affection is no doubt to be sought in the almost universal adoption of kurrams by the better coolies, combined with careful washing of the feet immediately on leaving work. The weakly coolie is always dirty and negligent in matters of this kind. He often eats his food without washing his hands, and it is probably quite exceptional for him to wash his feet at night.

# SYMPTOMS.

The first symptom is an intense itching and burning at the spot where afterwards the eruption appears. This is sometimes so distressing as to cause the sufferer to rub his feet on the ground or some other hard, rough surface in order to obtain relief. A faint papular eruption may be distinguished at this time, although sometimes a slight erythema is all that can be detected. This may occur within a few hours of infection, or may be deferred for twenty-four hours.

Later, usually about the second day, a distinctly vesicular eruption appears, which may be confined to the skin between the toes, or be found under the arch of the foot, or, as in a large number of cases, be chiefly seen in isolated patches over the dorsum of the foot, reaching sometimes several inches above the ankle. Apparently the affection is confined entirely to the lower extremities, no cases having been reported as occurring on any other part of the body, except as the result of experiment.

If early treatment is adopted the disease may be aborted, the vesicles drying up, and the patient becoming fit for work again in two or three days; more frequently the vesicles become pustules, or they burst, discharging a watery fluid, and then becoming open sores. If pustules have formed, unless they are speedily opened, the process may extend, the pus appearing to burrow under the surrounding healthy skin, and so forming large bullæ. In this way an area of several square inches may be denuded of skin.

In a large number of cases very severe inflammation occurs, associated with acute pain and great swelling, preventing the sufferer from walking; sometimes also extensive ulceration, or even sloughing, or gangrene takes place.

# ETIOLOGY.

As previous observers have pointed out, this disease is one of great importance to the employer of coolie labour, for during the seasonal epidemic more than 5 per cent. of a labour force may be temporarily invalided by its attacks.

Until recently nothing was known as to the cause of the affection, although various suggestions have

been made from time to time. Dr. Seheult (Trinidad) has stated that the condition is probably due to some chemical irritant present in the soil, either natural or due to manure used in cultivation. Dr. Dalgetty (South Sylhet), led astray by the superficial resemblance which the lesions of the disease bear to ordinary scabies, has described an acarus as the cause. His article in the JOURNAL OF TROPICAL MEDICINE was mainly devoted to an account of the anatomical characters and life-history of this mite, which certainly occurs as an accidental infection of neglected watersores, and may almost constantly be found in the scab or crust round the edges of any untreated ulcer in this part of India.

I have been familiar with this disease in its clinical aspects for the past three years, have frequently met with it in tea-garden practice both in Cachar and Assam; but until this present season I have had no opportunities for investigating the nature of the condition.

I had been engaged in investigatory work for some two months before my attention was called to Dr. Dalgetty's article. After reading it, I felt greatly surprised that my observations appeared to be entirely at variance with those recorded by him. As a result, I repeated my experiments and observations, in order to satisfy myself as to their accuracy.

A few simple experiments served to show conclusively that the condition, although possessing a superficial resemblance to scabies, is in no sense an analogous disease. Dr. Dalgetty's methods of investigation are open to sources of grave error; thus he says: "If care be taken to evacuate the pustule completely, and to remove at the same time any crust that may happen to surround the spot, then in a certain percentage of cases the ova of an acarus may be seen." He adds that he has frequently found living acari in this way, which is hardly surprising, seeing that they may be found by the score on any dry dead animal matter which is exposed to the air. If, however, he does not find the mite in this way, "he lays the pus or crust aside for a day or two, covered up and moistened with sterilised water, but not covered with a cover-slip."

It naturally follows that very soon some mite in search of food finds its way to the specimen put aside for future inspection. I first found the acarus on the scab taken from an old water-sore, but on the same day I was fortunate to come across a colony of the same acari feasting upon the body of an *Anopheles* mosquito that I had put aside on a slide about a week before. Since then I have found the mite on all sorts of decaying animal matter, such as dry fæcal matter, dead flies, &c.; and recently I bred about a hundred of them for experimental purposes upon the dead body of an ankylostoma.

It may here be remarked that the acarus described by Dr. Dalgetty seems to prefer dry to moist surroundings, and certainly it appears to breed very much more readily in the former.

In order to prove, however, whether or not the mite could produce the lesions of the disease, the following experiments were tried:—

Experiment No. 1.—A small quantity of soil was taken from a known infected area near to some coolie

lines, and after being moistened was applied to the arm, where it was kept in contact with the skin for a period of six hours, with the result that typical watersores followed. The soil that had just been utilised, as well as the unused portion, was then carefully examined with the microscope, but no sign of any acari could be found.

This experiment showed that the cause of the disease must be sought for in the soil from areas near the coolie lines. This soil, as has already been mentioned, is contaminated with fæcal matter in a very marked degree. Careful microscopic examination of samples of the soil from different areas was undertaken. The following list of living objects which were found present in these samples were noted down for future reference:—

(a) Rhabditiform larvæ of the ankylostoma duodenale (recognised by comparison with special cultures

of larvæ) were present in great numbers.

(b) Minute leeches.

(c) Minute earthworms recognised by their setæ.

(d) Several species of rotiferæ.

(e) Several different species of infusoriæ, both amæboid and ciliated.

(f) The spores and hyphæ of several microscopic fungi.

(g) Bacteria, rod-shaped, curved, spiral (?) and

While making these observations several further experiments were performed in order to show whether or not some chemical irritant in the soil might be regarded as the cause of the condition under consideration.

Experiment No. 2.—A small portion of the same earth that was obtained for previous experiments, and had been proved to contain the cause of the disease, was sterilised by being baked for a considerable time. Some of it was then moistened and applied to the arm as described previously. It failed, however, to produce any irritation, and thus completely negatived the idea that a chemical irritant in the soil was the cause of the disease.

Microscopic examination of the soil in parts of the garden where the disease was never contracted showed that earthworms and minute leeches were present in greater number there than in the fæcal infected places. Infusoria were to be found in pretty nearly as great numbers where decaying vegetable matter was present, and certainly could not be looked upon as a likely cause of the disease. Of the probable causes, some bacterium, some species of fungus, or the rhabdoid larvæ of the ankylostoma, had to be considered.

Meanwhile a large number of cases of water-sore had been carefully examined. In the earliest stage, when only a slight erythema showed where the vesicular eruption would shortly appear, blood films were prepared from the part affected. Nothing definite was derived from this procedure, although a few micrococci were seen once or twice. Scraping a patch of erythema showed on several occasions objects which at first were taken to be fibres of cotton or the shrivelled hyphæ of fungi, but when at last an intact and easily recognisable specimen of an ankylostoma larva was found, these objects were more carefully examined under a higher power, when they proved in a number of cases to be undoubtedly the empty

sheaths of similar larvæ. In the vesicular stage bacteria of certain kinds, lymph cells, a few blood cells, and once or twice a small amœboid organism were discovered. The pustular form of the disease showed staphylococci and streptococci, together with a few rod-shaped bacilli. Not having a microtome or other apparatus necessary for preparing sections, it was impossible to make this part of the investigation as complete as could have been wished.

Failing to find any definite cause for the disease by microscopic preparations for the lesions themselves, I once more turned my attention to the search for the cause in external Nature, and to this end the following

experiments were undertaken :-

(a) Some ordinary soil was sterilised by heat, and after being moistened with sterilised water was infected with a small quantity of fæcal matter, containing numerous ova of the ankylostoma duodenale.

(b) A similar preparation of soil was infected with a small quantity of fæces, which on examination were

found to be free from ankylostomal infection.

These two preparations were incubated at the ordinary temperature of the air for about a week. At the end of this time sample "a" was swarming with larval ankylostoma and various forms of bacteria and fungi, and sample "b," but for the absence of the dochmii, presented a similar appearance. Of "a" and "b" respectively two small quantities were taken, the first portions of which were kept moist, while the second were gently dried at the temperature of the air for a period of eight hours. Previous experiments with cultivations of the larvæ of the ankylostoma had shown that gentle drying at ordinary temperatures for a period of six hours was sufficient to kill the larvæ. The four preparations were then applied (after remoistening the two desiccated samples with sterilised water) to the wrists of the subjects of experiment, who retained them in a position for a period of about eight to nine hours. At the expiration of that time the bandages were removed. Fifteen hours after the first application of the earth, however, considerable erythema with a minute papular eruption appeared over the spot to which the earth containing embryo ankylostoma had been applied. Within twenty-four hours a distinctly vesicular eruption had developed, followed by pustules exactly resembling those found in the lesions of ground-itch. In the other cases a faint reddening of the skin was produced, which shortly afterwards entirely disappeared.

The small portions of soil which had been applied to the skin were then re-examined under the microscope. The sample which had been known to be swarming with the active embryos was found to contain no living larvæ, one or two dead specimens being all that could be detected. The sample that had contained dead embryos was seen to be full of their shrivelled bodies. Apparently, therefore, the living larvæ had entered the skin, and their entry had been followed by lesions similar in every particular to those found associated with the condition known as

water-sore.

It now remains to review the fact which various observers have recorded with reference to the clinical nature of the disease, and see whether or not they appear to agree with the theory deduced from the

results of the experiments and microscopical investigation described above. The disease only occurs when the atmospheric temperature is fairly high and the earth is saturated with moisture; moreover it only occurs in areas in which, as has been already shown, there is constantly increasing fæcal infection of the Where the disease is prevalent ankylostomal infection is extremely common. Giles, Dobson, Rogers, and others, have shown that upwards of 75 per cent. of tea-garden coolies are the subjects of ankylostomal infection, and my own observations point to an even more general infection in certain districts. Thus recently among some three hundred coolies, in all conditions as regards health, whose stools I examined microscopically, only one individual showed freedom from ankylostomal infection. It may thus be readily imagined what an enormous number of larvæ of this parasite may be set free in the soil when the conditions are favourable to their development.

As I have previously shown, desiccation at comparatively low temperatures is sufficient to kill the larval ankylostoma; this is a simple explanation of the fact that water-sores are never seen during the dry season. At this time the ground is hard, and on tea gardens, owing to pruning and other processes of cultivation, is also denuded of the vegetation which affords protection

from the rays of the sun during the rains.

The result is that the embryo ankylostoma—which hatches out from the ova within the first two or three days after they have been expelled from the host, in

the fæces-perishes almost immediately.

The very rare occurrence of the disease among the rural population is explained by the different methods adopted in the bushes for the disposal of human filth. It appears probable that the acuteness of the inflammation attending an attack of ground-itch is largely governed by the nature of the organisms which accompany or follow the larval ankylostoma in its passage through the skin. That this entry through the epidermis can and does occur has been recently demonstrated by Dr. Looss and Professor Sandwith, of Cairo; but I believe that I am the first to identify this entry of the parasite as the cause of the distinct and well-known skin affection so prevalent in this and other parts of the world.

TREATMENT AND PROPHYLAXIS.

In the papular and early vesicular stage of the disease, the application of a strong solution of salicylic acid in collodion or methylated spirit will cause the eruption to dry up, and so cut short the attack of the disease to one or two days. If, however, pus has formed, the only treatment of any service is the opening up and disinfection of the pustules with pure carbolic acid, silver nitrate, or nitric acid, and the after-treatment of the sore as an ordinary ulcer. In cases attended with great swelling, inflammation, and a tendency towards the formation of sloughs, free skin incisions and the use of hot antiseptic foot-baths are indicated.

The adoption of a proper conservancy system would probably entirely prevent the occurrence of the disease, but to anyone familiar with the habits and prejudices of the Indian coolie this solution of the question appears beyond the bounds of possibility.

The wearing of shoes or some kind of protection to the feet is known to be an almost certain preventive of the disease, and the frequent application of tar to the feet of those engaged in working in infected areas is a procedure of proved value. It is probable that the application of sulphur, or some strong disinfecting agent, to the soil in the neighbourhood of the lines may prove to be of use in destroying the parasite and so preventing the disease.

I have to thank Dr. P. K. Mitra, my assistant, for considerable help in carrying out the various experi-

ments described.

### EXCHANGES.

Annali di Medicina Navale. Archiv für Schiffs u. Tropen Hygiene.

Archives de Medicine Navale. Archives Russes de Pathologie, de Médec. Clinique et de

Bacteriologie.

Australasian Medical Gazette. Boletin de Medicina Naval.

Boston Medical and Surgical Journal.

Bristol Medico-Chirurgical Journal.

British and Colonial Druggist.

British Journal of Dermatology.

British Medical Journal.

Brooklyn Medical Journal.

Caducée.

Climate.

Clinical Journal.

Clinical Review.

Giornale Medico del R. Esercito.

Hong Kong Telegraph.

Il Policlinico.

Indian Engineering.

Indian Medical Gazette. Indian Medical Record.

Janus.

Journal of Balneology and Climatology.

Journal of Laryngology and Otology.

Journal of the American Medical Association.

La Grèce Médicale.

Lancet.

Liverpool Medico-Chirurgical Journal.

Medical Brief.

Medical Missionary Journal.

Medical Record.

Medical Review.

Merck's Archives.

New York Medical Journal.

New York Post-Graduate.

Pacific Medical Journal.

Polyclinic.

Public Health.

Revista de Medicina Tropical.

Revista Medica de S. Paulo.

Sei-i-Kwai Medical Journal.

The Hospital.

The Northumberland and Durham Medical Journal. Treatment.

# Motices to Correspondents.

1.-Manuscripts sent in cannot be returned.

2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Editors.

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

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# Original Communications.

NOTE ON THE SUPPOSED TRANSMISSION OF PLAGUE BY FLEAS AND OF RELAPSING FEVER BY BED-BUGS.

By George H. F. Nuttall, M.A., M.D., Ph.D. University Lecturer in Bacteriology and Preventive Medicine, Cambridge.

In the paper by Professor Galli-Valerio, which appeared in the JOURNAL OF TROPICAL MEDICINE of February 1st, 1902, the hypothesis of Simond, that fleas may serve as agents for the dissemination of plague, is very properly exposed to criticism. I quite agree with Galli-Valerio in calling a halt. evidence in favour of the "flea hypothesis" is worthless, and cannot withstand scientific criticism. I do not, on the other hand, wish to assert that fleas may not, under some conditions, transmit the infective agent. As Galli - Valerio points out, it is curious to see the ignorance displayed by medical writers as to the habits or existence even of different species The main arguments brought forward by Galli-Valerio against Simond's hypothesis were already advanced by me in 1899, in the publication cited by him at the foot of page 34 of this Journal, leaving out, of course, reference to more recent publi-My experiments with plague, anthrax, mouse septicæmia, and chicken cholera were reported upon in the Centralblatt für Bakteriologie in 1897 and 1898 (vol. xxii., pp. 87-97; vol. xxiii., pp. 625-635), investigations being conducted with Musca domestica, Cimex lectularius, and Typhlopsylla musculi. I refer the reader to these publications for numerous facts upon which I cannot enter here. My experiments with flies clearly proved that these insects might be a source of danger in the dissemination of B. pestis. On the other hand, all attempts to infect mice and rats through the bites of freshly-infected fleas and bugs proved futile; on the whole, upwards of 250 infected

insects having been experimented with. The germs were digested in the alimentary canals of the insects,

this taking place more or less rapidly.

Kolle has recently reported that he has obtained negative results from experiments conducted in a manner similar to mine. In other words, we have no trustworthy experimental evidence in support of Simond's hypothesis. Judging from experience in the manipulation of fleas and bugs in my experiments, there should be no especial difficulty in repeating them on a larger scale with plague infected animals. It would, however, be a rather "ticklish" matter to conduct such experiments in a country free from plague. It seems to me that these experiments would perhaps make it unnecessary for Galli-Vallerio to subject himself to an experiment. The first step should be to clearly determine if plague is transmitted from rat to rat, or mouse to mouse, by their own flea. I cannot agree with Kolle's statement that this question is mainly one of academic interest, the main point being that these rodents do disseminate plague. In all these questions a thorough knowledge is better than partial knowledge.

In Dr. Christy's paper (pp. 39-40, of this Journal) reference is made to a possible connection between bed-bugs and relapsing fever. As far as I know, Flügge (1891) was the first to suggest the possibility of vermin serving to spread this disease. Tictin (1897) was also imbued with this idea. He made experiments with bed-bugs, which he allowed to suck recurrent fever blood, and subsequently crushed, injecting the blood they contained into monkeys. When the blood was taken from the bug immediately after it had sucked, the monkeys inoculated with it acquired the disease; on the other hand, the result was negative with blood taken from bugs after an interval of forty-eight hours. Although the Spirochata stained normally, they had ceased to be motile after forty-eight hours in the bug. Tictin did not push the observation further, but judging from my experiments with the various species of bacteria above

noted, the Spirochata must have begun to degenerate. That they were subsequently digested is also highly probable. It seems to me, therefore, that no value can be attached to Christy's experiment on himself where he allowed himself to be bitten by bugs up to two weeks after they had infected themselves. I should suggest in any case a repetition of the experiment upon a suitable species of monkey, the bugs being transferred, as in my experiments above quoted, immediately after an interrupted meal, from a diseased to a healthy subject. We know nothing of the life history of the Spirochætæ outside the body, but it is possible that being a motile organism it may, by its own movements, leave the mouth-parts or digestive tract of the bug for the body of the host whence the insect is sucking blood. Bugs are easy insects to manipulate. I have kept them without food or water for several months, and in this condition they will bite immediately when dropped into a test-tube which is inverted upon the skin of man or various animals (rabbits, rats, mice, guinea-pigs, chickens).

# TWO NOTES ON MALARIAL FEVER IN CHINA.

By W. G. K. BARNES. Staff-Surgeon, R.N.

(1) AFTER reading the article by Major Fitzgerald, R.A.M.C., in the *British Medical Journal* of July 15th, 1899, on the treatment of malarial fever by the inunction of crossote, I determined to give it a trial.

During the stay of H.M.S. "Undaunted" off the Wusung Forts for over four months in the summer of 1900, we had very numerous cases of benign tertian fever on board. In some of these I tried the inunction treatment, at first using 3ss of creosote to 3i of olive oil, but afterwards substituting lanolin for the oil. Pure beechwood creosote was used. The best case I had was one of the lieutenants. After using the creosote once, I explained to him that I wished to try and "cure" him without quinine. He was no stranger to the fever, and said he did not care what I did as long as I relieved him when he got the headache. Treatment by creosote only was persisted in for five days, but the daily attack continued, and I could detect no difference in the blood examination from day to day. Some of the men were also experimented on for from two days to a week, but in no case did there seem any signs of a "cure."

In all cases, after from ten to fifteen minutes, perspiration commenced and the headache and nausea (if present) disappeared absolutely. The temperature would drop from 104° to 99° or so in half an hour. Perspiration was excessive, so much so that in one case I had to change the man's mattress.

If the inunction was performed at the height of the fever there was no after-rise. If commenced with the premonitory chill (we hardly ever had a marked rigor), or before the temperature had attained its expected maximum, the temperature would still rise, but not to the height that might have been anticipated without treatment, and there would usually be no headache or nausea. It seemed to me that there was little or no afterdepression such as is seen after cold bathing or

To sum up: I concluded that the inunction is of no use as a "cure," but I should certainly use it on seeing for the first time a case of malarial fever with a temperature of 104° or over, preparatory to giving quinine. I also propose to try it, when opportunity arises, in the hyperpyrexia of pneumonia or other diseases.

(2) In 1897, while "hulked" in the "Tamar" at Hong Kong, we had a severe epidemic of malarial fever on board. In very many cases it was noted that when the tongue was protruded it was deflected most markedly to one side, usually the left. Surgeon Rock and myself both estimated that this symptom was present in about two-thirds of our cases.

# MALARIAL FEVER AS MET WITH IN THE GREAT LAKE REGION OF CENTRAL AFRICA.

By Albert Ruskin Cook, M.D., B.Sc.Lond., B.A.Camb.

Late Scholar of Trinity College, Cambridge.

(Continued from p. 58.)

The convincing proof was, however, yet to come. On March 19th a woman had been admitted suffering, it was assumed, from chronic malarial infection, parasites being readily seen in her blood. temporary improvement resulted, however, from quinine given by the mouth and hypodermically, or from Warburg's tincture. On April 8th the blood examination again detected parasites in spite of the quinine. On April 11th the patient succumbed to increasing asthenia. A careful post mortem showed unmistakable signs of typhoid fever, the lower part of the small intestine was studded with typical typhoid ulcers. Peyer's patches and solitary bodies were swollen and ulcerated. The long axis of the ulcers was longitudinal. The edges were overhanging and the bases sloughy, penetrating in one or two cases nearly to the serous coat of the gut. The ulcers were much more numerous and larger as the ileo-cæcal valve was approached; there were enlarged mesenteric glands; the spleen was enlarged, soft and pigmented; there were signs of recent bronchitis in the lungs; smears taken from the spleen, liver and mesenteric glands and stained with methylene blue, gentian violet, and methylene blue and eosin, showed malarial parasites to a moderate extent everywhere, sporulating forms being found in the spleen, and isolated rods here and there resembling either Eberth's bacillus or the B. coli.

I have given this case in some detail because the opinion is still strongly held that typhoid does not occur in Uganda, one doctor going so far as to assure me he could not believe it. Had he come to Mengo a careful examination of our preserved specimens would probably have convinced him. The fact is very important in the way of prophylaxis and avoidance of contagion, the stools needing careful disinfection, &c. The last three cases I have given are typical cases of a mixed infection—typho-malarial fever. Once armed

with this knowledge one could solve many a puzzling problem. During my absence from the hospital in 1898 the Sister left in charge admitted a case of apparent severe fever, who suddenly died with profuse hemorrhage from the bowel. In the absence of any certain knowledge, I had remembered this case as possibly one of those fever cases associated with severe bowel hemorrhage that are said to be met with now and then. I have little doubt now it was typhoid.

At the present time, July, 1901, I have under my care a far more typical case of what is undoubtedly

typhoid.

The presence, then, of the parasite in the blood does not permit us to exclude typhoid, as a mixed infection may be present. In the latter case the temperature chart is often very irregular, being modified by the kind of malarial fever. It is hopeless looking for rose spots in a native, and in a European prickly heat, &c., often produces a factitious rash. Often the stools are typically pea-soupy, but constipation has been met with in several of our cases. Distension of the abdomen and tenderness over the ileo-cæcal region is very valuable, also the character of the headache, a dull headache being more characteristic of typhoid. I have observed marked tremors, too, in the latter case, and deafness not due to quinine. Bed-sores are very apt to occur if the native has been treated at home, and bronchitis is often met with. Lastly, the convalescence is far more protracted in enteric, the patient remaining weak for years. Phlebitis and pneumonia are not uncommon as sequelæ.

# DYSENTERY.

It is merely important to notice that there is a form of malaria in which mucoid and blood-stained stools are passed which might easily be mistaken for simple dysentery, did not the presence of parasites in the blood show the necessity for quinine in addition to the usual astringent remedies.

Anomalous as it may seem, severe diarrhœa is frequently due to fever, and although these attacks often yield to astringents alone, yet it is of obvious advantage to attack the fons et origo mali and destroy

the parasites.

The comatose or hyperpyrexial forms of fever have probably often been mistaken for sunstroke, and the delay thereby occasioned in having recourse to quinine may be fatal for the patient. Fortunately, a blood examination renders the diagnosis plain. One case occurs to me as a good example. A European residing in Busoga was known to have exposed himself to the sun, and was shortly afterwards found lying on his bed unconscious. As soon as possible a medical man was summoned, who, with commendable forethought, besides employing suitable remedies for sunstroke, which he was assured the attack was, took several films of blood which he gave me the opportunity of examining. On staining I found numerous typical parasites. The man made a good recovery under quinine, and careful enquiry elicited the fact that the first symptoms of illness preceded the exposure to the sun, and the latter was the effect, not the cause, of the illness.

### PLAGUE.

Plague is endemic in Uganda, sporadic cases occurring from time to time, while occasionally an epidemic will break out and sweep away seventy or eighty people. The disease is usually limited, owing to the method in which the native villages are separated from one another. Here, again, the microscope is most useful. Only a short time ago a case of supposed plague was brought in with high temperature and enlarged femoral glands. The buboes were aspirated, and films made showed no bacillus pestis, while typical parasites were seen. Quinine rapidly ended the fever.

Small-pox, again, is endemic here, and now and again one is apt to be caught napping. One and a half years ago, when on a journey, a "boy" of my European companions complained of fever. I had no microscope with me. The usual remedies were given, but his temperature remained high, 103° to 105° F., and on the evening of the third day a few shotty papules were noted on his forehead. Four natives were vaccinated and he was carried by them on a litter to the capital, where he tardily recovered from a severe attack of confluent small-pox. Another case was more pardonable, for a mixed infection was present, the microspore showing the presence of parasites in her blood, and a typical small-pox rash being developed.

Perisplenitis, due to fever, is not infrequently diagnosed as plastic pleurisy of the left side, nor is this to be wondered at when it is remembered that the pain in the side, shortness of breath, friction rub, stabbing pain on cough, &c., are signs common to

both

Pneumonia, heart-failure, coma, meningitis, and bronchitis are only mentioned to emphasise that they are often present with fever, either concomitantly or as sequelæ.

Non-malarial fevers are a very puzzling class, about which very little is as yet known. Excluding the important class of abortive typhoid fever, we may say that their resistance to quinine, and the absence of the malarial parasite, distinguishes them from malaria.

# PREDISPOSING CAUSES.

These have mostly been enumerated in the foregoing paragraphs. The most potent is a previous attack, then follow chills, over-fatigue, exposure to the sun, the presence of another illness, mental depression. The catamenial period is a specially dangerous one for women and the puerperium. A European lady, who assured me that she never had fever, had a high temperature the day after her confinement. I made a blood examination and found typical parasites. The temperature rapidly lowered under quinine.

# AGE.

No age is exempt. Natives who live to a great age seldom seem to suffer, probably because they have, through multiple infection, developed a relative immunity. As regards the other extreme of life, I have seen cases of fever in children four, five, six and ten days old, confirmed by finding parasites in the blood.

PROPHYLAXIS AND IMMUNITY.

I have said nothing about the extra corporeal cycle of the fever parasite because I have had no opportunity for research in this direction. Every fact one comes across here verifies the brilliant induction drawn by Manson and verified by Ross, Bignami, Celli, Bastianami, &c. Anopheles is everywhere present in Uganda, the little black mosquito that we all dislike so much from its smarting bite, its low hum, and its persistent attentions being, I take it, Anopheles funestus. A phenomenon that puzzled me before the promulgation of the mosquito theory, namely, small, limited epidemics of fever, is by it easily explained. Four or five cases may come into the hospital from a particular house or group of houses within a few days of one another, all suffering from the same kind of fever. Doubtless there is a pool close to the house that breeds Anopheles larvæ. Coming to the practical point of prophylaxis, the bearing on it of the mosquito theory is evident. Speaking for Uganda, I may say that the prevention of mosquito bites by living in elaborately defended houses, with doors and windows covered with mosquito netting, is quite impracticable, for the simple reason that mosquitoes do not agree to bite only between the hours of 6 a.m. and 6 p.m., as they seem to do in Italy. It must be remembered that sunset and sunrise occur here, situated as we are on the equator, approximately at these hours all the year round. At Mengo, with the surrounding swamps well drained, and in well-constructed European houses, we suffer very little from mosquitoes. But when travelling-no infrequent occurrence of course -- the swamps which intersect the country in every direction form a very happy hunting-ground for the mosquito. I have a vivid remembrance of a journey I recently made in North Uganda, the little pests buzzed in clouds round our heads and legs in the morning, and though they got fewer after 10 a.m. they bit occasionally, even at noon. It is, of course, essential to sleep inside a well-constructed mosquito net, and not to trust to a native servant to tuck it in. Pools of water likely to afford breeding-grounds for Anopheles, near the house, should be drained, and flower vases, saucers for plants, cisterns, &c., periodically emptied out.

The better prophylaxis then, for here at any rate, is the regular taking of a five-grain tablet or tabloid of quinine daily, in the morning with breakfast. If a person cannot be persuaded to do this (and the theory of Koch that blackwater fever is caused by over-doses of quinine has done harm that it will take many years to eradicate) he will probably agree to do so while journeying in a specially malarial region, or when

feeling out of sorts.

The immunity secured by regular doses of quinine,

though not perfect, is of a very high order.

Natives certainly have a relative immunity, though this is, of course, liable to break down, and as a class they suffer severely from fever. I find on examining the last thousand entries in the out-patient book that 110 (11 per cent.) were cases of fever. Out of 1,796 consecutive admissions to the hospital no less than 455 cases were of malarial fever (25.5 per cent.), with 53 deaths.

Their relative immunity is shown by the undoubted fact that one may often discover malarial parasites in small numbers in their blood without the clinical signs of fever. Whatever agency, whether phagocytic action of their leucocytes or anti-toxin products elaborated in the serum or spleen, or bone marrow, or elsewhere, may be at work limiting the growth of the parasites, it is liable to break down, and the unchecked division of the sporocytes soon leads to the outburst of fever. Presumably then, even these apparently healthy people may, through transtellation of their blood by an Anopheles, infect others.

The third series of reports of the Malarial Committee of the Royal Society shows most interesting

facts in the study of immunity of the natives.

Unfortunately I have only seen a brief resume, which has reached me too late for me to do much

work on the same lines.

The Commissioners found that the proportion of native babies under two years of age infected by malaria was very large. In Uganda it is very difficult to ascertain exactly the age of the infant, as the parents never know, but I found parasites in the blood of every child under two which I tested. I, however, have so far only examined the blood of twenty-two infants (one was older, about three years). The majority of these presented the clinical symptoms of fever, but in nine cases the temperature taken in the arm-pit or groin ranged only between 96.4° and and 98.5° F. Christopher and Daniels remark on this point: "Children may have the estivo-autumnal parasites in their blood and yet appear in excellent health, and need not suffer from fever." This would be corroborated by the temperatures I have given above. They also lay stress on the high proportion of children with enlarged spleens. Taking 100 children under two years of age, I found that 40 had enlarged spleens. The children were selected quite independently of their having fever or not. Of 100 adults taken in the same way only 17 had enlarged spleens. Of those definitely ill of fever of all ages 44.8 per cent. suffered from enlargement of this organ. It is evident, therefore, that a very large proportion of children are infected with malaria, and they, as Koch has pointed out—an inference also drawn by Drs. Daniels and Christopher-must be largely the means of infecting the mosquitoes, and through them the adult. The practical conclusion the Commissioners draw is that there should be a separation of European and native quarters of at least 400 yards; an almost impossible condition out here, either for Government officials, traders, or missionaries.

# SEASON OF THE YEAR AS REGARDS MALARIAL INFECTION.

The subjoined table gives the number of cases admitted during the several months of four successive years into the hospital:—

January .. 54 August ... 38 September ... 20 October ... 32 November ... 38 February .. 50) Rainy March .. 14) season. April .. season. November .. 40) May .. .. 30 Often rainy. December June .. .. 55

As a broad rule the dry season is the more danger-

ous of the two, but it must be remembered that rarely a month passes without some heavy showers, even during the so-called dry season; probably quite sufficient to leave pools of water, in which the larvæ of Anopheles may develop.

COMPLICATIONS.

Many of these have been described already, and it will be sufficient to merely enumerate them. Such are blackwater fever, diarrhœa, dysentery, severe vomiting, pneumonia, meningitis, coma, and bronchitis. The last and pneumonia are often due to chills caught

during the sweating stage.

Malarial Amblyopia.—I have seen several cases of this in natives who have never had quinine, so that quinine amaurosis cannot have been a contributory cause. Unfortunately the patients I have seen came when already totally blind, and failed to improve under any treatment. I have been struck with the paucity of pathological appearances seen in such cases by the ophthalmoscope. Probably the lesions are largely microscopical. In the cases I have seen the

blindness has been bilateral.

Neuritis. -- Sciatica and facial paralysis, both usually unilateral, are not uncommon. The former being a common malady, it is a little difficult to be certain that it is due to malaria, but one case I saw in a European gentleman came on during the course of an attack of fever. He was most averse to taking quinine and suffered also from typical brow ague. overcame his objection to quinine he rapidly improved. Facial paralysis is probably common, but in natives it is difficult to get a reliable history. I have seen two Europeans who have suffered from it. In both cases it cleared up in about six weeks.

Neuralgia.—Not tic major but tic minor, or merely shooting intermittent pains, not very rarely develops in the subjects of chronic malarial infection. One European I saw was very bad with this, but recovered completely under quinine, arsenic and iron,

and change of scene.

Peripheral Neuritis.—This is said to be very rare, but excluding minor degrees I have had one patient under my charge, a girl aged about 10, who exhibited the most classical form of the disease which directly followed on a severe attack of fever. There was severe pain on gently squeezing the muscles, absence of knee-jerks, paresis of the muscles of both legs and arms, simulating paralysis. She eventually made a

good recovery.

Epilepsy.—This is very common among the natives.

In one case under my care, a boy of about 4, a sharp attack of fever seemed to start epilepsy. Perhaps in this case it should be regarded as a sequel rather than a complication. On April 18th, 1899, he fell ill with fever, and was brought to the hospital on April 21st, with a high temperature and frequent attacks of convulsions. Parasites were detected in the blood. Under the influence of quinine the temperature steadily declined, but on April 27th he was having typical epileptic attacks. They quickly subsided under appropriate treatment and by May 8th

Convulsions are of course common in children. Delirium is very common, especially with a high temperature.

Hyperpyrexia, i.e., temperatures over 105° F. is also common, but responds very readily to treatment.

Gangrene.—This rare and interesting complication has been described in a paper by Professor Osler in the Journal of Tropical Medicine, December, 1900. We have had one case in the total number of cases of fever that have been under treatment during the last four years—some 5,000 in number. This was a man who came in with fever and developed gangrene of the arm, which progressed to a fatal termination.

Miscarriage.—This is a most common complication amongst the native women. The usual history is that they come to the hospital complaining of symptoms of miscarriage and suffering from fever. As they generally apply for treatment when the miscarriage is inevitable it is but rarely we can prevent it. Quinine acts very promptly in reducing the fever, and there does not appear to be any special liability to relapse during the puerperium in these cases. If the child has attained a viable age, in utero, it has a very poor chance of surviving, being handicapped even above the general run of premature children. A point to which I hope to turn my attention is whether maternal ague can be transmitted to the fœtus by way of the placenta, as for example, small-pox or syphilis. A priori, I should imagine not, but the debility induced by the fever on the mother acts disastrously on the child. One would imagine that any malarial toxin produced by the manufacturing activity of the maternal parasites would circulate in the blood of the

Nephritis.-This is decidedly rare if the presence of actual renal casts be required as proof of the lesion. As stated above, I have found albumen in the urine of 74 per cent. of fever patients, but as a rule this entirely and rapidly clears up. The most I ever entirely and rapidly clears up. noticed was 1 albumen. Here the fever was complicated by meningitis and the person died. One does not see what, for instance, is so common in scarlet fever, the plain and unmistakable onset of nephritis. Bright's disease is not common in Uganda, in 1,500 consecutive admissions into the hospital only 10, or 6 per cent., were diagnosed as cases of nephritis.

Phlebitis is not uncommon in chronic cases, especially in subjects weakened by insufficient

food, &c.

# SEQUELE.

The most common is severe anæmia. Repeated attacks lead to a very characteristic chronic malarial cachexia, called by the natives "Musana," which simply means daylight, and doubtless has reference to the lightening of the dark skin of the face.

A single sharp attack may much lower the number of corpuscles and their contained hæmoglobin. Thus in one European, a severe attack lowered his red blood corpuscles to 3,880,000 per c.mm. and hæmoglobin to 74 per cent. of normal (as measured by Gower's hæmocytometer and hæmoglobinometer). This was an uncomplicated attack of quotidian fever rapidly cured by quinine. It was not the first attack he had had in the country, however. After a course of iron for five weeks and a voyage on the Lake his blood values were 7,420,000 per c.mm. and 116 per cent. hæmoglobin. Children suffer even more. In a baby about two years old, after fever the blood values were found to be 1,010,000 R.B.C. per c.mm. and only 17 per cent. hæmoglobin. Yet she eventually made a good recovery. In the typical case of severe anæmia the woman-for it is far commoner in women than in men-is pale, the face, instead of being black or deep chocolate colour, as the native complexion usually is, being more fawn coloured. The palpebral conjunctive are dead white, the ocular conjunctivæ being light lemon coloured. The tongue is pale, flabby, and often marked by the teeth. Loud venous hums in the neck and hæmic murmurs over the cardiac area are nearly always present. The spleen may be much enlarged, but sometimes is not. They are breathless and constipated, and their blood examination may show, in addition to great paucity of corpuscles and low hæmoglobin value, abundant poikilocytosis. In a word, they much resemble cases of pernicious anæmia. They frequently have attacks of fever. Pregnancy and most of them seem to become pregnant-is very fatal; again and again I have seen their condition get worse and worse, they develop severe cedema of the feet and legs, and almost invariably miscarry about the fifth or sixth month and die.

One case bore a child at term, but the fœtus was born dead and with skin peeling off. The next time she bore a living child, but she had been on large doses of iron for many months with occasional quinine administrations. One curious point about this class is that they are generally well nourished, not to say fat and well-looking.

Dementia and mania are well-marked sequelæ in Uganda. The prognosis is usually good, a large proportion recovering on quinine and nerve sedatives.

### DYSMENORRHŒA.

This condition is common amongst European ladies in the tropics. I have seen one case in which, absent at first, it seemed to develop after a long series of malarial attacks.

Blackwater fever seems never to develop, except in the subjects of malarial infection. It is often immediately preceded by many slight attacks of malarial fever.

## PROGNOSIS.

In attempting to form an estimate of this most important question, it must be remembered that other factors besides purely medical ones crop up. An isolated European in the country may have been quite out of the reach of any trained nursing. An unconscious or delirious man, with only unskilled native servants to look after him, may have his life jeopardised, where proper attention and suitable food would have pulled him through. By the time the doctor has arrived, unchecked temperature or constant delirium may have rendered his work much harder.

Assuming common sense precautions have been taken, in intermittent fever the prognosis is very good. Long-neglected cases may, however, suddenly take on pernicious symptoms. In mild remittent fever the prognosis is still very good. In the bilious remittent form it should be more guarded, and in severe remittent and the pernicious attacks every hour is of importance. In no other illness is the old Latin axiom more applicable—Dum vita est spes est.

Every medical man who has practised for any length of time in the tropics must have seen cases apparently in articulo mortis which have yet made a good recovery. Typho-malarial fever and meningeal symptoms render the prognosis very grave.

In blackwater fever the mortality is very high, but great care should be taken that anxiety felt by the physician should not be communicated to the patient.

TREATMENT.

Increasing experience merely deepens the conviction that every fair-minded man, sooner or later, arrives at, that in quinine we have the remedy for malarial fever. Different circumstances may modify the way in which it is given, or the dose for administration, but the patient whom quinine fails to cure is in a perilous position. From time to time new remedies are announced in this as in every other disease, but one by one are laid aside in favour of the old-fashioned remedy.

old-fashioned remedy.

As regards, then, direct treatment by drugs, quinine in some form will be chosen. It is a very necessary precaution to see that a patient is not only taking but also absorbing the drug. In January of this year I was attending a lady suffering from severe tertian intermittent fever accompanied by much headache. She was taking 20 grains of quinine daily, but exhibited no signs of cinchonism, and the fever continued unchecked. On changing the sugar-coated pills she was taking for uncoated tablets, ringing in the ears quickly supervened and the temperature at

once dropped.

In the case of young babies I usually order the quinine, from one to three grains, to be given in solution per rectum. In severe cases, if given per orem, it had better be given in solution. A point that I have often noticed is that a dose of fifteen, or in some instances even ten, grains is sufficient to cause faintness and slight collapse, with damp, clammy skin, and most unpleasant subjective symptoms in some Under these conditions a stimulant should certainly be given along with the quinine. From time to time people will be met with who either cannot or will not take quinine. The former class is fortunately very small, much smaller than is generally supposed; with the latter, who are generally of a neurotic disposition, some stratagem must be used, provided a few straightforward arguments fail to set matters right. In the case of one gentleman who was suffering from most severe intermittent fever, the temperature rising with a sharp rigor of 105° F. every night, and who informed me that it was quite impossible for him to take quinine, saying it produced such an effect on his nerves, I told him I should have to give him some morphia injections. I need hardly say I dissolved very considerable doses of quinine in the morphia solution, and in two days his temperature dropped to and remained at normal. Subsequently I informed him what I had done, and he was quite convinced that he could take some quinine, at any rate without injuring himself. With some of these people combining potassium bromide with the quinine is advantageous.

In all cases presenting pernicious symptoms quinine should be administered hypodermically or intravenously. For hypodermic injection I dissolved

quinine—acid hydrochloride—the most soluble salt of quinine. Twenty minims of water readily dissolve 5 grains of salt. After trying various situations I prefer the interscapular region of the back. The skin should be sterilised and a platino-oridium needle used. A steel needle rusts inside in the tropics and it is then very difficult to sterilise it. Ten grains is a quite large enough dose, and it should be repeated every eight hours, if necessary.

Blood examinations should be made from time to time in serious cases to see if the parasites are duly

disappearing.

I am trying methylene blue in various cases, but am not very much impressed by its value where quinine fails. Thus in a case now under treatment, a boy was admitted suffering from a tertian intermittent. He was placed on 15 grains of quinine daily, and while taking this his fever took on a remittent form. On July 2nd, seven days after treatment was commenced, the evening temperature was 103.6; the next night it was 104.8. July 4th, morning temperature 103.6. He was then placed on 2 grains of methylene blue thrice Within ten minutes of taking the first dose he was found to be sweating profusely, and his temperature was found to be 97.8. That may have been mere coincidence, but his temperature never was more than half a degree above normal till July 11th, when it registered 99, and on July 12th (evening), it was 104.6, and July 13th, 105.2. He was then put back on quinine. If methylene blue be given to European patients it should be given in capsules to avoid staining the tongue, the digestion should be carefully watched, and above all they should be warned not to be alarmed if they pass bright green urine.

Arsenic, especially combined with strychnine and iron, is of great use in convalescence, and in chronic cachexia due to malarial infection. It is not nearly

so useful in acute cases.

Where there is constipation the bowels should be kept open. Large enemata are dangerous in severe prostration, the patient sometimes showing signs of faintness, &c. Glycerine enemata are excellent, or a smart purge of calomel in a sthenic subject. Headache is best treated with phenacetin and antipyrin, but these should not be given in cases accompanied by a In such conditions I have seen very weak pulse. dangerous collapse take place, in spite of brandy having been given with the antipyretic. Hyperpyrexia is best met by cold sponging and cold affusions to the head. The latter is most grateful to the patient, and they remember the comfort it gives for years after. Sleeplessness is best met in an acute case by a hypodermic injection of morphia, with or without atropine. It seldom has to be repeated more than two or three times, as quinine will then have lowered the temperature. Of course, the patient should be on slop diet till the temperature has fallen. As regards dose and time of administration, much depends on the individual, but if the fever is severe a drop in the temperature should not be waited for, but quinine in full doses administered at once. In mild cases it will suffice to wait till the sweating stage. From 20 to 30 grains should be given in two or three doses per diem till the temperature drops, and then at least 10 grains daily for the next week. If no relapse

occurs 5 grains should be given daily for another fortnight.

Complications are, of course, met by appropriate

remedies.

Hypodermic injections of  $\frac{1}{25}$  grain strychnine are very valuable every four hours in heart-failure. Severe vomiting may be controlled by bismuth and soda, or in severe cases by one minim doses of tinct. iodi. in a teaspoonful of water every fifteen minutes till the vomiting stops. Champagne is often well Delirium is usually much lessened by tolerated. Acute splenitis is often reducing the temperature. soothed by hot belladonna and glycerine fomentations. With chronically enlarged spleens I generally use unguentum hydrargyri iodidi rubri, rubbed well over the tumour till the skin is sore, with quinine and, if necessary, arsenic internally. Anæmia requires free doses of iron, but the tongue should be kept clean, and in many cases of severe anæmia it seems but Here, again, arsenic may be added In pregnant women large doses of of small use. advantageously. quinine should be given with great caution, for it may act as an ecbolic. It is said that it is only the mineral salts of quinine that has this property. I tried tannate of quinine in one case. It only slowly reduced the temperature, however. In a first pregnancy, provided the temperature does not rise above 104°, miscarriage seldom seems to take place. one case in which it took place the woman had had fever for three weeks, the temperature being about 104° several times. In blackwater fever the question has been most fiercely debated whether quinine should be given or not. Personally, I always start by giving full doses of quinine per rectum, if the stomach, as is generally the case, does not tolerate it. I also like to give a full dose of calomel and to promote diuresis and diaphoresis in every way. Should vomiting prove intractable I give nutrient enemata every four hours, and only give small quantities of aerated home-made lemonade to quench thirst, by the mouth. Very free exhibition of stimulants may be needed in this exhausting disease.

Typho-malarial fever demands the most unremitting nursing, night and day, if the case is to be carried

to a successful issue.

In some desperate cases of fever change of situation has had the most favourable result, nor need the move be very far. I have known the change from a damp valley to the top of a hill, less than a mile away, apparently save life in two cases.

Invaliding home to Europe is nearly always necessary in the case of blackwater fever, and may be ordered in cases of chronic infection when other

remedies have proved useless.

Nothing can be more conclusive of the merits of an article than its successful sale and general use. Hartmann's Wood Wool Vaccination Pads are a case in point. Since January 1st, 1902, this enterprising firm has turned out and sold 15,000 dozens of vaccination pads per week, a fact that amply proves their utility and comfort in wear to those vaccinated. It may be added that these articles are recommended by the leading public vaccinators, and have been approved of by the Local Government Board.

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### THE

# Journal of Tropical Medicine

MARCH 1, 1902.

# THE POST-GRADUATE COLLEGE AND POLYCLINIC.

Some three years ago a small coterie of men, under the leadership of Mr. medical Hutchinson, established Graduate College in London. The institution has for the most part taken the second of its baptismal names-the Polyclinic-which, whilst it conveys to some extent the kind of instruction provided, does not indicate that the institution is intended for post-graduate study. Be this as it may, however, the post-graduates in all parts of the Empire seem to have heard of the college and its work, for it has attracted medical men from all points of the compass. At the opening of the college many rumours of obstruction were in the air, and even now one occasionally hears waning evidence of antipathy The college, however, is based upon the surest

foundation, for it is none other than that of imperative necessity. The need for such instruction as the college gives, owing to the rapid advance of science, is a settled fact, and the case for post-graduate instruction requires no advocate. The number of medical men who daily throng the clinics, lectures, laboratories, and practical classes held within the walls of the college, testify in a convincing manner to the demand for an institution of the kind; and it also shows a most noteworthy and healthy tone in the medical men of the present day that they avail themselves of such instruction.

The Polyclinic is purely a "medical man's" institution. It was founded, financed, and carried on by medical men; and it is the only public institution of the kind in the country that has such a basis.

Such being the case, it may be safely said that the reputation of the profession generally is bound up in this institution; and on its success or failure the good name of a great profession is staked. To allow the college to fail would cast a slur upon medical men, not only upon those who are actively concerned in carrying it on, but upon the profession throughout these realms and the empire generally.

Post-graduate teaching is a necessity; it must be conducted away from medical schools intended for students; and the London Polyclinic is the only serious attempt in Great Britain to meet these requirements. That the necessity for postgraduate teaching will continue for all time may be regarded as a positive axiom, and that an institution such as the London Polyclinic will be required in which to conduct the instruction is also a certainty; and it therefore remains to be seen whether the medical men of the present day are public-spirited enough, and sufficiently in earnest about their profession, to carry their college to a high platform of usefulness. That there are earnest men amongst us the attendance at the Polyclinic shows; it is no dilettante attendance either, for the medical men who attend there are not the idlers in medicine, but the most earnest and the hardest workers, and therefore the best, our profession has to show.

There is every sign that the Polyclinic is an institution that has "come to stay," and it behoves the profession generally to see that it is supported in every way possible. It is the duty of every practitioner in these islands to contribute to the support of the college, for with its success the reputation of the profession is intimately bound up. We have but one fault to find with this institution, namely, cheapness. For a guinea a year a medical man can attend daily clinics and many courses of lectures by men entitled to teach the subjects they deal with. Cheapness may seem a good fault, but the college has to be maintained, and to try to do this at the phenomenally small subscription of one guinea annually, considering what is given for it, is well nigh an absurdity. It must be noted that in addition to these clinics and lectures, the laboratories have to be maintained; the Polyclinic Journal, a monthly periodical, is given away to each member; reading rooms and a library have to be supported; and last, but not least, a museum of valuable clinical materials has to be provided with funds.

What attractiveness there may be in the small fee demanded tends to restrict the usefulness of the college, and runs the risk of hampering and crippling one of the most public-spirited institutions that the medical profession has ever taken upon itself to create.

To no class of medical men is the Polyclinic more useful than to those coming home from the tropics, and the large number of members recruited from thence shows how keenly the institution is appreciated by them.

A glance at the teachers and lectures in the college testifies to the quality of teaching given. The most distinguished men in the three kingdoms give their services, and the character of the instruction is therefore of the broadest and most catholic kind. The many cases now sent for consultation show how valuable the work of the Polyclinic has come to be, and how deep a hold the system in vogue has attained. The great want of the college, namely, a hospital, will one day be met, for it will be demanded by the great body of the profession. We therefore urge the

authorities of the Post-Graduate College and Polyclinic to throw aside their timidity and their fear of offending the more narrow-minded and the less public-spirited members of our profession, who condemn and are willing to sacrifice an institution, be it however useful, because it might interfere with the institutions with which they themselves are, in some way or other, connected.

The bulk of the medical profession have but little sentiment concerning institutions, however mediæval may be their origin and their so-called rights. The wants of medical men are proclaimed by the interest they take in the Polyclinic, and we are mistaken if at no distant date the Polyclinic becomes the most powerful medical institution in the land, and will be able to have all that it wants, be it a hospital, a Government grant, or anything that is necessary for the teaching of modern medicine.

# Review.

TROPENHYGIENE MIT SPECIELLER BERÜCKSICHTIGUNG DER DEUTSCHEN KOLONIEN. Von Professor Dr. Friedrich Plehn. Kaiserl.Regisrungsarzt, Z.D. (Tropical hygiene with special reference to German colonies, with medical advice to colonial officials, officers, missionaries, the leaders of expeditions, planters, and overseers. Twenty lectures given at the Seminary for Oriental Languages during the winter session, 1900-1901. By Professor Friederich Plehn. Illustrated. Pp. 283. Gustave Fischer, Jena. 1902.)

These lectures are intended as a guide to laymen who are so situated in the tropics that they cannot readily obtain the services of a physician. They will, however, be found of value to the physician when he first arrives in the tropics to take up practice. The lectures are explicit and simple, and should prove of inestimable value to those for whom they are intended.

The three first lectures deal with the tropical climates and their influence on Europeans. The four following lectures are taken up with malaria, its origin, prevention, and treatment.

Other subjects touched upon are blackwater fever, small-pox, plague, skin diseases, diseases of the stomach and intestines, animal parasites, snake and arrow poison, and diseases of the eye and ear.

The last six chapters give useful information concerning outfit for the tropics, tropical dwelling houses, daily life in the tropics, the hygiene of expeditions; and the last chapter is devoted to medicine chests and their uses.

Dr. Plehn has produced an excellent guide for the

tropics, and his book is sure to be popular with all laymen who have already gone, or intend to proceed, to the tropics, either for the purposes of travel or to take up permanent residence there.

# Mews and Motes.

We have pleasure in informing our readers that Lord Lister, Dr. Patrick Manson, C.M.G., and Professors Laveran and Virchow have been elected as Honorary Fellows of Société de Medicine de Gand, and that Major Ronald Ross, F.R.S., has been made Corresponding Fellow of the same Society.

Organisation of the Colonial Medical Service.

— [The Editors have taken upon themselves to withhold the name of the medical officer who sends this
letter, although not instructed to do so by the writer.

— Ed., J.T.M.]

"SIR,—As Chief Medical Officer of one of His Majesty's Crown Colonies, I have read the article on the unification of the Medical Service in the JOURNAL OF TROPICAL MEDICINE of December 2nd with great interest.

"The scheme is one which should have the support of all Colonial Medical Officers, as the present system is unsatisfactory from many points of view, especially so from that of men working in the smaller and more distant colonies.

"According to the present system a man obtains an appointment in a certain colony, and is told on appointment that he has a chance of promotion in due course. Some time passes, and he finds that his advancement, with few exceptions, depends on vacancies occurring in his own colony. The colony is small; the vacancies are few. The consequence is, that after several years he finds himself still in the same place, and in receipt of the same salary, whilst junior men, quite new to the service, have been given appointments in other colonies to which his experience in the tropics would have rendered him eligible, and which if the Colonial Medical Service had been unified would have fallen to him.

"The pension and leave regulations also require serious consideration. They vary much in the different colonies, and Sect. 97 (of the C.O. Regulations, 1901) should be specially pointed out to each applicant for a medical appointment in the Colonial Service, as the clause referring to private practice considerably alters the amount, or may even do away with his chance of a pension altogether.

"I quite see that the difficulties in the way are great, and they may to some persons seem insuperable, but with united action a great deal may be done, and the opposition which this scheme is certain to meet may be finally overcome.

"It is, I presume, intended to form a Central Committee in London to try to carry out this scheme, concerted action amongst the widely scattered Colonial Medical Officers being a practical impossibility.

الروي والله والمالية

"Assuring you of the sympathy and support of the other Medical Officers of this Colony,

"I am, &c.,

"A MEDICAL OFFICER,
"The Editor, "Colonial Medical Service.
"The Journal of Tropical Medicine."

# Current Miterature.

A Phase in the History of Cholera in India. By Andrew Duncan, M.D., B.S.(Lond.), F.R.C.S., M.R.C.P.

Physician to Scamen's Hospital Society; Joint Lecturer on Tropical Medicine, London School of Tropical Medicine; Physician to Westminster General Dispensary.

My first lessons on cholera were received at the hands of the late Sir George Johnson, at the time Professor of Medicine at King's College, London. The originality and lucidity of his theory of collapse, and the rationale of the treatment advocated by him, as well as the striking examples of the propagation of the disease by water narrated, had left an indelible impression on my mind. Judge, then, of the astonishment with which I listened when at Netley to the eloquent lecture on cholera by the late Professor Maclean, C.B., a lecture in which we were told of the views of the disease we should meet with in India. Professor Maclean rightly controverted this disastrous theory, and warned his hearers never to believe in them. This view certainly does not adorn a tale; nevertheless I venture to tell the tale.

India is pre-eminently the land of sacred pilgrimages. Let me narrate in particular the history of one of them. Every year to Hurdwar, the head of the great Ganges Canal, a pilgrimage takes place; but as every twelfth year is a specially sacred year, an especially large body of pilgrims wends its way thither. The ritual is the following: On the chief day of the pilgrimage, each individual by his religion is impelled to bathe in the canal, and a space divided off is set apart for the purpose; he not only has to bathe in it, but has to drink some of the sacred water before he leaves it; whilst, thirdly, some of the water is in numerous instances taken away in bottles to their homes by the pilgrims.

In the year 1867 such a twelfth-year festival took place. Just before the conclusion of the gathering, cholera broke out amongst them, and with the dispersal of the pilgrims a vast epidemic spread over India. The Sanitary Commissioner with the Government of India in 1867, in his subsequent report on the outbreak, thus writes: "First, in considering the causes of the epidemic, he decides it was not due to filth and bad sanitation, for the camp was kept far better than, and in marked contrast to, all preceding fairs. Secondly, it was not due to atmospheric phenomena. For there was nothing to show that there was any variation in temperature, or air pressure, or rainfall, different to those of preceding years. Thirdly, was it due to importation? There was

cholera in the Terai in 1867." The superintendent of the district writes: "The pilgrims took it to Hurdwar, and from Hurdwar they brought it back, and spread it on all sides. Numerous deaths occurred amongst the pilgrims proceeding to Hurdwar prior to the outbreak." In the Bhurtpore district, again, cholera was present on April 6th. The Maharajah of Bhurtpore visited Hurdwar with a large retinue just at the time when the disease began to be disseminated. The Sanitary Commissioner thus concludes in paragraph 40 that neither filth nor atmospheric causes were to blame. Hence, "if not general at the fair, it must have been brought there. This idea is quite consistent with facts; it is quite consistent with the etiology of other diseases, such as small-pox, regarding the propagation of which we have more precise information. Even had it been impossible to discover the probable source of the importation, the arguments would not have become invalid; but there is the direct testimony of the superintendent of the Terai, that pilgrims going to Hurdwar from his district had the disease among them and died on the way. It is sufficient to state that the disease, as it broke out at Hurdwar, appears to have been introduced by pilgrims from some infected district." Now the night before the great bathing day (April 12th) a heavy storm flooded the camp; the sewage arrangement favoured the washing of the sewage itself into the Ganges. On the day succeeding the storm the pilgrims bathed in the river, each pilgrim drinking of the water. bathing-place was a space 650 feet long by 30 feet wide, shut off from the rest of the canal by rails. Into this narrow enclosure pilgrims from all parts of the encampment crowded, bathed, and drank of the water. The water was thus drunk foul and contaminated by whatever was washed from the bodies or clothes of the pilgrims. Cholera broke out in an epidemic form on the day after. I now quote again the remarks of the Sanitary Commissioner:

"Par. 300. The effects of the dispersion of the pilgrims in spreading cholera.—On this question the facts have been narrated with great care; every statement of any importance has been given, for the evidence has been considered not with the object of supporting any preconceived theory on the mode of propagation of the disease, but with the sole view of endeavouring to ascertain the truth. Did the pilgrims as they returned to their homes carry cholera with them, and thereby occasion the outbreak which subsequently followed in the various districts through which they traversed or to which they belonged?

"Par. 301. On the first part of the question there can be no difference of opinion. That cholera went with the pilgrims from Hurdwar, and accompanied them to a greater or less distance in every direction, is a fact which admits of no dispute. Suffice it to say, that the pilgrims bore the disease with them to a distance varying from 50 to 300 miles in almost every point of the compass.

in almost every point of the compass.

"Par. 302. This fact in itself may be regarded as evidence of communicability of the disease. That the pilgrims imbibed the poison at Hurdwar in large quantities cannot be doubted, but it is not probable that the disease should remain latent so very long as to appear among some of them only when they

reached places so far distant as the Upper Provinces of the Punjab. Judging from all that is known of the disease, it appears much more probable that these and others who were seized weeks after they had left Hurdwar, were infected by pilgrims in whose company they had travelled, than that the germs of the disease had remained all that time undeveloped within their greater.

within their system.

"PARS. 303, 304. The results of the details regarding the advent of the cholera-stricken pilgrims, and the subsequent appearance of the disease amongst the general population of the districts who had been previously free from it altogether, may be thus summarised: Excepting Goorgaon, in which the history of the first case is doubtful, no cholera appeared in any of these fifty-one stations or districts until ample time had elapsed for the pilgrims to reappear, or for others to enter from infected places. There was no simultaneous outbreak of the disease over a large area; but the general evidence is not merely negative, for, excepting Goorgaon, there was no cholera in any of the fifty-one places named until the pilgrims actually had returned, and even in Goorgaon the epidemic prevalence dates from their return.

"Par. 305. But even more remarkable is the evidence that in most cases the first cases in the district were pilgrims who had been to Hurdwar. In thirty-five out of the fifty-one districts the first persons attacked were pilgrims, and after they had been seized the disease appeared and spread amongst

the residents.

"Par. 306. In addition to the facts are the decided opinions of the numerous medical officers and civil officers by whom the facts were observed. Thirty-two medical officers, many of them men of great experience, who were indefatigable in carrying out the arrangements for the care of the devotees, and most careful in ascertaining the facts connected with the appearance of the disease within the limits of their own charges, are decidedly of opinion that the cholera was imported by pilgrims. . . . In no case has any positive evidence been advanced to show that such a cause was improbable, much less that it was impossible.

"Par. 307. There are only two ways in which these facts can be satisfactorily disposed of. Either they must be set aside as untrustworthy, or they must be accepted as making out a very strong case in favour of the opinion that cholera is spread by human intercourse. It is quite impossible that the whole story of the returning pilgrims carrying cholera with them from Hurdwar to Rawal Pindi, with the dates of its appearance in the successive districts through which they passed, can have been invented. The facts cannot be set aside. It cannot be regarded as a mere coincidence that in thirty-five districts of Upper India, covering an area larger than that of Great Britain, the epidemic should have gradually appeared in one place after another, immediately after the return of a body of pilgrims stricken with the disease.

"Par. 308. If not by the pilgrims, how was the disease spread? It could not have been carried by the wind in all directions at one and the same time, nor is it probable that the force of the wind should have exactly kept pace with the pilgrims. There are, no

doubt, difficulties to be explained under any theory

which attempts to account for the fact.

"PAR. 309. Analogy of other diseases.—But it is to be remarked that similar difficulties exist in regard to the spread of diseases, the communicative nature of which is undisputed. Can it be explained why small-pox prevails in some years and not in others? It is a singular fact that all epidemic diseases of which we have any accurate knowledge are communicable, and however fitful and inexplicable the cases may be, it may be fairly assumed that every new case is usually, if not always, the progeny of a parent of like kind, although the parentage often, and indeed generally, cannot be traced. The seed of a plant affords a not inapt analogy to what appears to be the most rational view of the germ of epidemic disease. In order to germinate and bear fruit, it must fall and be received in a suitable soil. It must be planted at the proper season, and enjoy the advantages of climate and circumstances which are best adapted to its growth. Similar conditions appear to be necessary for the propagation of an epidemic. With little doubt the germ of epidemic cholera appears to reside in the evacuation of a person suffering from the disease.

"PAR. 311. But whatever theoretical difference of opinion may exist as to the propagation of cholera, the fact of the great epidemic of 1867, and its spread over Northern India, teach no doubtful lesson, and it is this--that human intercourse plays a very great part in the diffusion of the disease, and that returning pilgrims in particular are very dangerous arrivals.

This was the lucid summary of events given by the Sanitary Commissioner with the Government of India for 1867. The chief points to which he drew attention

were the following:-

(1) The disease spread to every point of the compass. (2) The outbreak was not a simultaneous outbreak over a large area. (3) No cholera appeared in any place until the arrival thereat of infected pilgrims. (4) This fact could not be regarded as a mere coincidence. (5) In most places the first cases were among pilgrims, subsequently among the residents of the places attacked. (6) Out of fifty-one districts attacked, the medical officers were of opinion that it was due to importation in thirty-two cases, but that in none of the other cases was such a mode of origin improbable, much less impossible. (7) The conclusion arrived at, namely, that the return of the pilgrims is very dangerous, inasmuch as they play a very great part in the diffusion of the disease, and that the poison lies in their evacuations; that it is not due to bad sanitation or to atmospheric causes.

Such, then, is the history-so admirably portrayed by the Sanitary Commissioner with the Government of India for 1867—of one of the most striking examples of the propagation of cholera by human intercourse. As Professor Parkes truly declared, it was an example on a gigantic scale of cholera water poisoning.

Time went on, and with it a change of opinion occurred in the office of the Sanitary Commissioner with the Government of India. For in 1878 we find the officer who then held the appointment, in the orders of the Berar Sanitary Report, stating: "The chapter on cholera is too much occupied with the statements and opinions of civil surgeons on the

importation doctrine. Little or no practical good can be expected from such inquiries, and it is therefore of great importance that the time of the medical and other officers should not be spent on them. If it were demonstrated that cholera is spread by human intercourse, nothing could be done to prevent such intercourse." This was written, as stated above, in 1878.

In 1879 the great twelve-years' festival again came round. Again the vast assemblage of pilgrims took place at Hurdwar; again was cholera affecting them at Hurdwar; and again after the great day of the festival did "cholera burst out like a long-pent-up fire," and was carried away by the departing pilgrims to our North-Western Frontier, and thence to Afghanistan. But now, unfortunately, our troops were at war with Afghanistan. Camp by camp the disease invaded the three lines of advance.

In the Peshawar Column. - Thirty-eight cases occurred in May; 284 cases in June; 32 cases in

July; 4 cases in October.

In the Kurran Valley Column.—Nine cases occurred in July; 12 cases in August; 1 case in September; 12 cases in October.

In the Candahar Column.—One case occurred in

June; 52 cases in July; 41 cases in August.

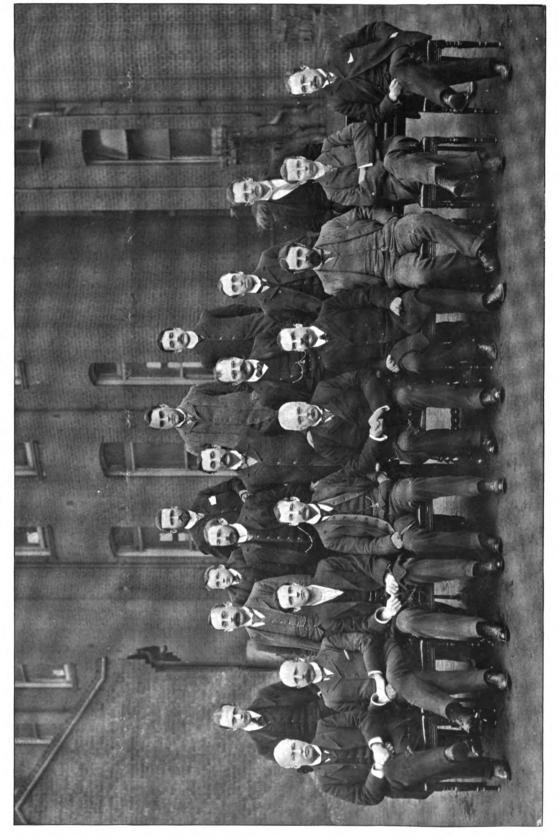
Now, in reviewing these figures, one fact stands out pre-eminently, namely, that in the Khyber line there was nearly an eightfold increase of cases in June over those of the preceding month. In neither of the other two columns is there this remarkable increase of cases in any one month over another. Is there any reason for this? There is. Let me quote

from Surgeon-Major Pringle :-

"From this intensely cholerised centre (Hurdwar), the outcome of the gathering of literally hundreds of thousands of pilgrims, with cholera proved to be in their midst, resulted what was known among the troops returning from the last Afghan war as 'the march of death.' Another proof of the penalty demanded for the violation of all sanitary laws and sanitation." The peace of Gundamack had been signed, and Government wished to withdraw troops from the Khyber line. But cholera was advancing up the pass. Most of the troops at this time were encamped on spurs above the plain, and were in good health. By remaining, it was held that they would become exposed to the "atmospheric wave," whereas by returning they would march away from it. By remaining, it was held they would be attacked in greater numbers. The withdrawal, therefore, took place in June, and the march of death resulted. 'The choice was a choice of evils; and great as the loss was, there seemed every reason to believe that it would have been equally great, perhaps greater, had the troops remained where they were." But I venture to submit that the statistics of the disease in the other columns are not favourable to this opinion advanced by the Sanitary Commissioner with the Government of India. In the Kurram Valley no month stands out preponderating in cholera mortality, there being only nine cases in the British troops in the first month, and twelve cases in the second. In the Candahar column, counting the cases at the end of June with those of July, there was a decrease of twelve cases in the second month. In the Kurram

# LONDON SCHOOL OF TROPICAL MEDICINE.

8th Session, Jan.-March, 1902.



d, S. H. R. Lucy, T. A. Dowse, H. E. Wareham, H. E. Wareham, Brooke, A. T. L. Fox, J. A. Blaynevy, M. Manicol, H. E. Wareham, Brooke, A. T. L. Fox, Sambon (Lecturer, Dr. Sambon (Lecturer, C. W. Samoni (Lecturer, C. W. Seacombe, R. E. G. Tillike, M. F. Manners, C. W. Seacombe, R. E. G. Tillike, J. R. Delmege, J. Maye, Robert (Laboratory Assistant), G. B. W. G. Ross, P. A. Nightingale, Mr. K. W. Goadby (Lecturer), T. S. Kerr, D. Absent: -A. Fells, F. W. Lewis,

. .

Valley, the troops moved out on to the surrounding spurs in most instances, and the result showed that, granting they were penetrated by an "atmospheric wave," the mortality was practically unaltered-nay, even in some regiments which lay more in the course of this wave in the plain, there was no increase of

mortality at all.

We thus see that the views of the Sanitary Commissioner with the Government of India for 1878 and 1879 were diametrically opposed to those of the Sanitary Commissioner with the Government of India for 1867. By one, infection by human intercourse was held to be the cause of the epidemic; by the other, an atmospheric wave "was the fons et origo Let us now, therefore, examine the arguments of the latter official; and such examination cannot be better carried out than in the spirit advocated by the Sanitary Commissioner for 1879. In par. 19 of his Sanitary Report, this official thus writes in 1879: "The problem to be solved requires patient investigation, and a calm judgment which shall not be swayed by any preconceived ideas or deterred by fear of adverse criticism. The cholera controversy has, unfortunately, excited much animosity and bitterness between those who differ in opinion. The doctrine of human intercourse is for the time the popular doctrine both with the medical profession and with the public, and neither facts nor arguments which are at variance with this view find much favour. All this is to be deeply regretted. If this doctrine is true, it can afford to stand the fullest criticism and the most thorough investigation." Animated by these inspiring sentiments, I propose to give in the following lines the fullest criticism and the most thorough investigation into the arguments and facts of the "climate and other cause theory.

The arguments for the "climate and other cause

theory" may be thus enumerated:—
(1) The one-sided anecdote argument. (2) The X Y Z argument. (3) The railway and steamboat argument. ment. (4) The hospital assistant argument. (5) The coincidence or stage-coach argument. (6) The logical method of reasoning argument. (7) The direction of the epidemic argument. (8) The hill station argument. (9) The *ipse dixit* argument. (10) The experience of India argument. (11) The non-spread by

water argument.

(1) THE ONE-SIDED ANECDOTE ARGUMENT.— We have seen that in par. 19 of his Sanitary Report for 1879, the Sanitary Commissioner with the Government of India notes that the doctrine to which he is opposed can, if it be true, afford to stand the fullest criticism and the most thorough investigation. following is an example of this fullest criticism. careful investigations of authorities who uphold the theory of human intercourse are characterised as "one-sided anecdotes," and all facts adverse to the view are held to have been suppressed. Considering that the greatest investigators of our time are here implicated, such men, including that truly great man Parkes, Cornish, Burnell, De Renzy, Macnamara, Kenneth M'Leod, George Johnson, Simon, Nelten Radcliffe, Liebermeister, Koch, and a host of names of cosmopolitan celebrity, the accusation of "one-sided anecdotes" and of "suppression of facts" bears with

itself its own refutation. Again, was the Report of the Sanitary Commissioner with the Government of India for 1867 issued on a basis of "one-sided anecdotes"? It is indeed somewhat surprising that the large number of medical officers of 1867, who were then stated by the Sanitary Commissioner with the Government of India to have been "men of great experience, and most careful in ascertaining the facts connected with the appearance of the disease within the limits of their own charges," should have been succeeded by men apparently endowed with precisely

opposite mental characteristics.

(2) THE X Y Z ARGUMENT.—"A hundred people are asked what is the cause of epidemic disease? Ninety-nine would probably reply that epidemics are due to contagion; that a sick person coming from some place or other brought with him the germs of disease, and that these germs found a fitting place for their development in the persons of other people. But now the hundredth individual, in the person of the Sanitary Commissioner with the Government of India for 1879, steps in, and says this is no explanation at all; for supposing a person Z is suffering from an epidemic, then there is little satisfaction in being told that it was imported from Y, and that the epidemic in Y was imported from X, for in time we shall get to A, and then where can A have got it from? Of this train of reasoning we can only say with gratitude that it would banish the whole body of infectious and contagious diseases from our midst. A poor relation to this argument is also to be found in the following: The case is cited of a person suffering from a disease, or coming from a place where such a disease is prevalent, and then becoming attacked by it. Shortly after his arrival in his new locality, one of those in his own house, or of those living in the neighbourhood, is attacked also. It is then usually judged or at any rate suspected—that the first person has been the cause of the disease in others. Now this conclusion is at once totally rejected by the Sanitary Commissioner with the Government of India for 1879. Because "there are others who have not suffered "!!! Following this line of argument, it will at once be seen how beneficial to mankind at large must be this elementary principle of Indian sanitation, for no infectious or contagious disease could possibly exist if this line of reasoning be true.

(3) THE RAILWAY AND STEAMBOAT ARGUMENT.—The Sanitary Commissioner with the Government of India for 1879 held that human intercourse has nothing to do with the diffusion of cholera, because railways have not facilitated the progression of the disease. Let me subject this statement to the "fullest criticism."

A. Railways.—(a) The Cholera Report of Dr. Rice on the outbreak of cholera in the Allahabad district in 1882 shows facts utterly opposed to this dictum.

(b) Deputy-Surgeon General A. B. De Renzy, C.B. the Sanitary Commissioner for the Punjab, showed how the frequency of cholera in the North-West Provinces increased since the introduction of railways. The dates of the epidemics show unmistakably how the latter increased in frequency after the introduction of railways. Thus the dates are as follows: 1805, 1813, 1827, 1845, 1856, 1861, 1862, 1865, 1867, 1869, 1872, 1875, 1876, 1879, 1881.

(c) The example narrated in support of this part of his argument by the Sanitary Commissioner himself apparently confirms his dictum, but "the most thorough investigation" does not do so. Thus—

		- 1	Admissions for Cholera						
Station	Years	Strength	Jan. to June	July	Aug.	Sept.	Oct.	Nov.	Dec.
(	1856	1576			435	65	1		
Meair Mir-	1861	1700			601	64			
	1869	974							
1	1872	1358		1	179	5			

The Sanitary Commissioner thus comments: glance at these cases will show that in 1869-1872, they occur no earlier than they did before in 1856-1861. At Meair Mir it is worthy of note that in the epidemic of 1861 the first case among the Europeans was on August 2nd. In 1872 it was on July 31st, a difference of two days." But in his comments on the above statement, Surgeon-General de Renzy, the Sanitary Commissioner at Punjab, draws attention to the remarkable fact that the details of the epidemic of 1867, which began in May and attained its maximum in July, and in which there were eighty-six cases with fifty-two deaths, is omitted from consideration, "although the influence of railway communication in diffusing it was most marked." Again, the same officer showed how no mention is made of the fact that in 1872 cholera appeared in May, and was most virulent in June in the lunatic asylums at Lahore, about five miles distant only from Meair Mir.

(d) Dr. Barry, in his Cholera Report for 1896, showed how increased facilities for steam communication by land and water have conduced to a rapidity in the diffusion of cholera hitherto unprecedented.

(e) In 1892 cholera appeared in Afghanistan. It became epidemic, and, marching slowly through Persia, it was at Teheran in 1892; once it touched Russian territory it spread along the railway with startling rapidity. At Askabad the epidemic came into contact with the Trans-Caspian Railway, spread eastward and westward along it, reached Baku, and thence found its way along the Trans-Caucasian Railway to Tiflis. Within a month of the recognition of the disease at a town on the Trans-Caspian Railway, it had penetrated into the heart of European Russia, having taken it in its transit from Central Asia as many days as, before the creation of railways, it took months. In its advance it clung in a remarkable way to the main lines of traffic, i.e., along the railways and the Volga.

(f) In 1882, after the pilgrimage to Tirupati, Surgeon-General Burnell showed how cholera followed the dispersion of the pilgrims in all directions except towards the north; now there were no pilgrims going towards the north, as no railways led there, but his report on the subject evidently was not deemed worthy "of the fullest criticism, or the most thorough investigation into the arguments and facts."

as Surgeon-General Burnell was invited to resubmit it. This, however, was not done by that officer.

B. Steamboats.-That ships do carry cholera is shown by evidence so strong that I must confess I do not see how it could be stronger. The evidence of all the epidemics that have occurred in England is irrefutable on this point. The same also with the outbreaks in America. To take one example. On October 10th, 1871, four days after the last case of cholera at Stettin, the ss. "Franklin" sailed thence for New York, with 486 'tween deck passengers, 55 cabin passengers, the ship's company, a cargo of merchandise, and 19 bales of rags packed in canvas. the tenth day out cholera broke out. By November 6th, when the ship arrived in the quarantine harbour at Halifax, forty-two men had died of the disease. On November 6th and 7th, two men from Halifax went on board, and were employed in coaling and watering, and were "exposed for some hours to the poisoned air of the ship." Both were seized with cholera on the same day. From one of them the disease extended to his family, and then in widening circles through his village. No cholera had been present in Nova Scotia since the spring of 1866, when the ss. "England" had arrived with cases on board. This ship also brought the disease, the whole western hemisphere having been free for some years previously from cholera.

(4) THE HOSPITAL ASSISTANT ARGUMENT .- This venerable argument would seem apparently to be impervious to the effects of senility, and to ripen and mellow like wine. It is this: the hypothesis concerning human intercourse cannot be true, inasmuch as hospital attendants are never attacked with greater frequency than other classes of the community. Putting aside the fact that when occasion favours they are more attacked, the whole question is begged by this line of argument. For by it human inter-course is interpreted as contagion. But human intercourse may signify contagion in some instances, and may signify nothing of the kind in others. The same line of argument might be applied to enteric fever. Nurses do not as a rule catch enteric fever from enteric fever patients, and therefore it might be held that enteric fever is never spread by human inter-In order, however, finally to dismiss this argument, it is only necessary to state that cholera, like enteric fever, does not spread by contagion, as small-pox and the other exanthemata, but by infection as distinguished from contagion, by the sick infecting the healthy by means of the contagion of the sick entering the alimentary canal of the healthy with the food. The Sanitary Commissioner for 1877 in his report, par. 142, states as follows: "In order to prove that cases of cholera among attendants are due to contagion, it must be shown that attendants suffered in larger proportion than others." Accepting, then, this test of the truth or otherwise of the argu-

ment, let us now proceed to apply it.

(a) In the epidemic in Egypt in 1883, Surgeon-General Irvine in his report stated that the men of the Army Hospital Corps suffered out of all proportion to the men of the other branches of the service.

(b) Griesinger's statistics for Moscow for 1830 show the mortality amongst the hospital attendants was 30

to 40 per cent., whilst in the general population it was only 3 per cent.

(c) Laveran in Toulon in 1849 showed that out of 179 hospital attendants, 51 died of cholera, or 1 in 3, whilst in the garrison the mortality was only 1 in 15.

(d) In Oran, 1865, the mortality in the hospital staff was 8 per 1000; in the garrison only 1.66 per

1000.

(e) In 1865, at Toulon and Marseilles, the respective rates of mortality were as follows:—

In the 22nd Regiment ... ... 31.75 per 1000.
,, 28th ,, ... ... 29.8 ,,
,, 38th ,, ... ... 19.33 ,,
Hospital attendands ... ... 38.60 ,,

(5) The Coincidence or Stage-Coach Argument.—The theory that pilgrims from a cholera centre bring the disease is held to be as valid as a theory that in the old coaching days the coach brought the hoar-frost in the winter. Frost in the month of December, succeeding a date on which the coach from London had arrived, could be held to have been brought by coach on as valid grounds as that cholera attacking villages immediately after the arrival of cholera-infected pilgrims, could be held to have been imported by these pilgrims. Space forbids any consideration of this argument. Suffice it to say that the opinion of the Sanitary Commissioner for 1867 does not agree with that of the Sanitary Commissioner for 1879 as regards coincidence, as shown

previously in the Report for 1867, par. 307.

(6) THE LOGICAL METHOD OF REASONING ARGUMENT. -We are told by the Sanitary Commissioner with the Government of India for 1879, that in the investigation of cholera our inferences ought not to be drawn from a number of single cases, but that rather the etiology of the disease should be adjudged from a consideration of the subject generally as a whole. But a whole is generally held to be made up of its parts; and if the single parts point to one conclusion, it may be safe to express the opinion that the whole points identically to the same opinion. Again, the Sanitary Commissioner claims that by virtue of his office he has enjoyed paramount opportunities for formulating his theory of cholera, that it is due "to climatic and other conditions affecting certain localities," inasmuch as he has been able to judge of India as a whole. He denies that the civil or military surgeon serving in cholera camps, in the plains, is capable of forming a correct judgment merely from local outbreaks. But the greatest master of geographical pathology, Prof. Hirsch, of Berlin, has enjoyed still greater facilities in this direction; and from a survey of cholera as it has appeared in all countries, he holds it communicable by human intercourse, and sums up thus: "That it is human intercourse which furnishes the media for this communication is proved on a large scale by the observations on the diffusion of the disease by pilgrimages and military campaigns, both in India and beyond it; whilst there are other conclusive proofs, furnished in innumerable instances from the smaller circles of diffusion.'

(7) THE DIRECTION OF THE EPIDEMIC ARGUMENT.—As regards the epidemic from Hurdwar in 1879, it is argued by the Sanitary Commissioner for 1879 that

there is no connection between it and the dispersal of the pilgrims, inasmuch as very little cholera occurred in the Bengal Province. Unfortunately this is an argument that overreaches itself. Why did very little cholera occur in Bengal? For the very simple reason that very few pilgrims came from this part of India, and consequently very few pilgrims returned to it. Professor Simpson thinks that at most only one thousand out of nearly a million pilgrims came from

Bengal

(8) THE HILL STATION ARGUMENT.—With regard to the confutation of this argument, I cannot do better than quote the words of Surgeon-General A. C. De Renzy, C.B., a former Sanitary Commissioner of the Punjab. He thus writes: There are two surprising misstatements in par. 57 of the 9th Annual Report of the Sanitary Commissioner with the Government of India. The fact that the well-elevated hill station almost always escapes cholera, and the exceptions to this rule are inexplicable on the theory of human intercourse. After such a statement, it will surprise the reader to find that Murree, the most elevated of hill stations, has suffered terribly in three out of the eight epidemics which have visited the Punjab since There are, in fact, few Punjab the annexation. stations which have suffered more frequently or more severely. At p. 122 it is stated that the Murree depôt has suffered twice before from cholera, once in 1858, and again to a slight extent in 1867. It will be observed that in giving the previous cholera history of Murree, the statement is restricted to the history of the depôt, apparently for the purpose of ignoring the terrible sufferings of the native population of the sanatorium, in the midst of which to depôt stands." And Dr. De Renzy goes on to show that with regard to Simla a similar misstatement was made. Murree has, since these words were written, again suffered terribly from cholera. Dharmala, another hill station, also suffered from a very severe epidemic some years

(To be continued.)

# PLAGUE.

# PREVALENCE OF THE DISEASE.

India.—During the weeks ending January 25th and February 1st, the deaths from plague in India numbered 11,445 and 12,192 respectively. This shows a great advance in the death-rate from plague compared with the corresponding weeks in 1901, when the returns were 3,396 and 3,415.

The Punjab returns show the deaths from plague in this district to be 3,040 and 4,102 during the two

weeks in question.

In the Bombay districts the figures are for the weeks ending January 25th and February 1st, 4,622 and 3,822.

There is a slight increase in plague in the cities of Bombay and Calcutta, but in neither are the returns so large as in the preceding year.

A plague riot is reported from Patiala, where the plague medical officer was threatened.

EGYPT.—During the week ending February 15th,

six fresh cases of plague occurred in Egypt and six deaths from the disease. During the week ending February 22nd there were seven cases and five deaths

from plague.

The chief seat of the disease is at Tantah. Two cases have been reported from Kom-el-Nour, and one case in Alexandria. Since the outbreak on April 7th, 1901, there have been 304 cases of plague in Egypt, and 184 deaths from the disease.

MAURITIUS.—During the weeks ending February 13th and February 20th, there were fifteen and thirteen fresh cases of plague in Mauritius, and nine and eleven deaths from the disease, respectively.

CAPE OF GOOD HOPE.—During the week ending January 25th there were no fresh cases of plague nor any deaths from the disease notified in Cape Colony. Nine persons remained in hospital under treatment for plague on January 25th.

Shanghai.—The P. and O. ss. "Ballarat" was in quarantine on February 24th, at the Wu-Sung anchorage below Shanghai, with five cases of plague on board. Two of the patients succumbed to the

disease.

Australia.—Plague has reappeared in Sydney. Three deaths were reported during the week ending February 28.

POST-DYSENTERIC AILMENTS.—Haasler's observations were made at Tientsin, and his article is based on hundreds of post-mortem examinations conducted there. His vast experience leads him to conclude that death occurs in consequence of the destruction of the intestinal mucous membrane, the loss of power of the entire large intestine, or to peritonitis, hæmorrhage, and other complications. He is of opinion that injections are not advisable during the acute or ulcerating stage of the disease. Appendicitis is a danger that must not be lost sight of after recovery from dysentery, and contraction and stenosis of the intestine are frequent sequelæ. Circumscribed abscesses may remain and prove a source of relapse. Cardiac and renal symptoms seldom supervene as post-dysenteric symptoms, but pleurisy is common and the organs of respiration are frequently affected. -Deutsche Med. Wochenschrift, January 9th and 16th, 1902.

### EXCHANGES.

Annali di Medicina Navale.
Archiv für Schiffs u. Tropen Hygiene.
Archives de Medicine Navale.
Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie.
Australasian Medical Gazette.
Boletin de Medicina Naval.
Boston Medical and Surgical Journal.
Bristol Medico-Chirurgical Journal.
British and Colonial Druggist.

British Medical Journal. Brooklyn Medical Journal. Caducée.

Climate. Clinical Journal. Clinical Review.

Giornale Medico del R. Esercito

British Journal of Dermatology.

Hong Kong Telegraph.
Il Policlinico.
Indian Engineering.
Indian Medical Gazette.
Indian Medical Record.
Janus.
Journal of Balneology and Climatology.
Journal of Laryngology and Otology.
Journal of the American Medical Association.

La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal.

Medical Brief.
Medical Missionary Journal.

Medical Record.

Medical Review. Merck's Archives. New York Medical Jo

New York Medical Journal. New York Post-Graduate.

Pacific Medical Journal.

Polyclinic. Public Health.

Revista de Medicina Tropical.

Revista Medica de S. Paulo. Sei-i-Kwai Medical Journal.

The Hospital.

The Northumberland and Durham Medical Journal. Treatment.

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5.—Correspondents should look for replies under the heading "Answers to Correspondents."

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# Original Communications.

DURATION OF THE LATENCY OF MALARIA AFTER PRIMARY INFECTION AS PROVED BY TERTIAN OR QUARTAN PERIODICITY OR DEMONSTRATION OF THE PARASITE IN THE BLOOD.

By John T. Moore, M.D.

Demonstrator of Medicine, Medical Department, Univ. of Texas, and Chief of Medical and Nervous Clinics, John Sealy Hospital, Galveston, Texas.

Definition of terms.—Latency of malaria should be considered as a state into which the parasite has passed so that it does not show its presence in the individual by such symptoms as are manifested when active.

This state of latency is due either to an inherent inability of the parasite to declare itself or to a condition of the individual infected, whose organism holds, as it were, the parasites, so that their power cannot be manifested. The microscope will often reveal the presence of such latent infections, but not always

There may be, instead of a real latency, a *masked* form of malaria in which there are symptoms, and from operating causes they are atypical.

The investigation of the duration of the latency of malaria demands a careful study of the locality, as to its latitude, altitude, temperature, moisture, prevailing winds, water courses, contiguity to malarious districts, and all other conditions that oppose or encourage the growth and distribution of the malarial parasite.

Celli ("Malaria," page 157) says: "Malaria is, therefore, a local phenomenon which must be studied on the spot; and the data gathered in any particular territory cannot be generalised, or applied to all countries."

This leads me to say that I have accepted as proven

that the mosquito is the only means of infection. It seems to me the experiments of Drs. Sambon and Low in Ostia, and in other parts of Italy by Celli, Grassi, Fermi, the Red Cross Society of Italy, Bignami, and quite a number of others, prove this beyond question.

McFarland (New York Med. Journal, November 17th, 1900) says: "In order, therefore, that a person shall be infected with malaria, it is necessary that he shall be bitten by a particular kind of a mosquito and a definite length of time after it has become infected by the blood of a malarial patient."

Thayer (Trans. Congress of Amer. Physicians and Surgeons, 1900) says that the only proven way of malarial infection is by the mosquito.

Osler ("Practice of Medicine," 4th edition) seems to accept without reserve that the hæmocytozoa of malaria are transmitted to man only by the bite of the mosquito.

In order to prove that the parasite has been latent in any individual, it must be shown that the person has had no chance of reinfection. This is a difficult task to set oneself in this part of the world, where malarial fever is so widely prevalent. In older sections and countries where sanitation and better drainage have been secured, the question of the place where primary infection occurred should be more easily determined. There are, however, in this country localities that seem to be favoured by their location, conditions, and surroundings. Galveston, we may say, is one of that class.

I have depended upon my knowledge of the various localities in which the cases reported were exposed to the agents of infection, to determine the time at which the parasite entered the organism.

The manifestation of paroxysms occurring at the place suspected of being the one of primary infection, or soon after leaving such a locality, is taken as more conclusive evidence that the parasite entered the person while residing in or passing through that place.

The microscope has been relied upon entirely to ascertain whether these cases had a malarial infection or not. No case has been reported where I failed to demonstrate the presence of the parasite in the blood, no matter if a clear history of tertian or quartan periodicity was given.

Location.—Galveston is in lat. 29° 18' 17" N., long. 94° 47′ 26" W., situated on the eastern end of an island twenty-eight and three-quarter miles in length, and not more than three miles in breadth at

any point.

Altitude.—The island is not raised more than six feet above mean tide, thus making proper drainage a difficult matter. There are, on account of its slight elevation, quite a number of bays and small lakes in the western part of the city. The eastern and central part of the city has been filled, and is free of water except in the ditches following heavy rains. island is bounded on the south by the Gulf of Mexico, on the north by Galveston Bay, on the east by the Gulf of Mexico and the channels from the bay to the gulf, and on the west by West Bay and channel.

The prevalling winds for the past eleven years have been from the south-east directly from the Gulf of Mexico. The summers are long and mostly warm. Winters are short and mild, usually having a short period, when the temperature goes to about 40° F., and, from October to March, occasionally it may reach freezing, and then again in a few days a spring temperature. During the short periods of cold weather the wind comes from north-west or northeast, but soon changes round to south-east again, followed by warm weather. So Galveston has alternately spring and winter weather from October to almost April.

The shortest distance of the island to the mainland at any point is opposite Virginia Point, where the railways cross the bay a distance of one and three-The next shortest distance is from quarter miles.

the eastern end of the island to Bolivar Point, three and five eighths miles.

Soil.—The soil of Galveston Island is of clean beach sand. Rain water quickly sinks below the surface of There seems to be a stratum of salt water just underlying the island, the depth to which depends upon the tide, varying from two to three feet below the surface. The city is, however, favourably located as far as proximity to other districts is concerned. If the malarial-bearing mosquitoes are not bred on the island, then they must be brought

quite a distance across the bay into the city.

A few cases of malarial fever have undoubtedly originated here, but, from what can be learned, most of these came from the western part of the city. From three to six miles down the island are known foci of malarial fever. In 1900, of 481 cases admitted to the John Sealy Hospital, in which a blood examination was made, 153 of these cases were malaria. Of the 135 cases, in more than 90 per cent. their infection could be traced to some point outside of Galveston. A little less than 10 per cent. seemed to have become infected on the island. From January 1st, 1901, to November 1st, 1901, a more careful inquiry was made, and a closer record has been kept of the cases. Of the 421 cases admitted to the medical

wards of the John Sealy Hospital, where a careful blood examination was made, 53 of these proved to be malaria.

A diagnosis of malaria could not have been made in some of these cases other than by the microscope, as the symptoms of the coexisting diseases marked the presence of malaria. In order that the reader may get directly before him the result of this year's work, a table of these cases is presented, and by referring to an outline of the map of Texas, the point of infection in most of our cases may be located.

It will be noted that four cases, or 7½ per cent., received their infection in Galveston, and three of these, or 75 per cent. of those traceable to Galveston, received their infection in the western part of the

TERTIAN. DOUBLE TERTIAN.

No. of Cases	Place of Infection	No. of Cases	Place of Infection
1	Liberty, Texas.	1	Galveston, Texas.
1	Battle, Texas.	1	Trinity River.
2	Beaumont, Texas.	2	Unknown. Outside of
1	Mexico.	1	Galveston.
1	Galveston (East).		
2	Galveston (West).		
11	Unknown. Outside of Galveston.		

### ÆSTIVO-AUTUMNAL.

No. of Cases	Place of Infection	No. of Cases	Place of Infection
3	Cleveland, Texas.	1	Clear Creek, Texas.
1	Olive, Texas.	1	Bryan, Texas.
1	Trinity River.	1	Kountze, Texas.
1	Houston, Texas.	3	Brazos River.
1	Belleville, Texas.	10	Beaumont, Texas.
1	Dickinson, Texas.	1	Tampico, Mexico.
3	Unknown. Outside of	1	Little Rock, Arkansas.
	Galveston.	1	Galveston, West.

Again, to study the liability to reinfection in Galveston, I have made a careful search for the anopheles and its larvæ in suspected breeding places. While hundreds of the Culex pungens, C. soleicitans, and a number of Stegomyia fasciata have been found, only.

Six specimens of the Anopheles crucians have been seen by Drs. H. F. Sterzing, J. J. Terrell, W. L. Allison, and myself in and about the basement of the hospital. Other than these no other specimen of anopheles has been caught on the island. I visited at different times what appeared to be the most favourable breeding places of this genus of gnat, and systematically examined almost every pool of standing water in the city, but not one has been found.

I spent two days in Beaumont, Texas, a place from which, you will observe, about 23 per cent. of our total number of cases of 1901 came.

I not only found the adult Anopheles maculipennis, but found numerous breeding places of this mosquito in the city.

After carefully examining every ditch, pool, &c., in the neighbourhood of the hospital for breeding places, I came to the conclusion that those anopheles captured by us were brought into the city by freight cars which are hauled through malarial districts loaded with

grain and cotton.

Many of the cars are brought within two or three squares of the hospital, and as all railways coming into Galveston pass through the western part of the city, this may in some degree account for the greater number of cases of malaria that originate in that part of the place.

I have recently observed mosquitoes enter a passenger car and travel with us for two hundred miles. The transportation of mosquitoes by baggage is referred to by Harvey in *Med. Record*, June 22nd, 1901.

I found a breeding place and quite a number of the Psorophora ciliata in the west end. This genus of gnat was also found in large numbers near the Beaumont oil-field, a very malarial district, but in whose

immediate vicinity I found no anopheles.

I succeeded in infecting four psorophora from a case of æstivo-autumnal fever, and two days later found the parasites, hence I merely suggest that this mosquito may also carry the infection and be responsible for some of our cases. I present twenty-three cases, all of which, except four, are from observations made in the service of Professor J. W. McLaughlin, University of Texas Medical Department, to whom I make acknowledgment for his kindness in allowing me to use them in the preparation of this paper.

Case XII. was kindly furnished me by Dr. J. H. Ruhl, of Galveston. The other cases, I., VIII. and

IX., were from my own practice.

Two of the twenty-three, or 47 per cent., were tertian at one time, 5 per cent. of these becoming later on double-tertian. Twelve of these cases were estivo-autumnal, showing either quotidian or tertian parasites.

autumnal, showing either quotidian or tertian parasites. Tendency of Malarial Fever to Relapse.—Frequent reference is made, by almost all writers who have observed many cases of malaria, to the disposition or tendency for them to relapse. These observations were made by the earliest writers; while they were probably closer observers of many phenomena than we, would we not now, knowing the pathogenic agent, accept the clinical evidence that is frequently given of latency and relapses. The microscope must be used to make our diagnosis conclusive.

Fagg ("Principles and Practice of Medicine," 1st edition, vol. i., p. 242) speaks of relapses in the following words: "There is a strong tendency to relapse, not only under a fresh exposure to the ague poison,

but even independently of it."

Marchiafava and Bignami ("Twentieth Century Practice") say that the same conditions that favoured the primary infection favour a return of the fever.

There are, in fact, but few cases that are allowed to run their course untreated for any length of time, or are poorly treated, but that relapse, whether remaining in a malarial district or removing to some other place. Cases I., VIII., X., and XI. are good examples. I have often seen cases of simple tertian fever where the symptoms could be completely controlled by the administration of doses not exceeding five grains of quinine per day for three days, but would soon recur. The period of recurrence is usually in some multiple of the tertian paroxysm. Æstivo-autumnal types are

more apt to recur than the tertian or quartan, being much more resistant to treatment.

Circumstances Modifying or Determining the Period of Latency.—A sudden change of weather, a chilling of the body, overheating and overexertion are known to cause a relapse. I have known workmen who had previously had malaria to have a recurrence every time they were put to work on the roof of a building

exposed to the hot sun.

Hertz (Ziemsen, "Cyclopædia of Medicine," vol. ii.) calls attention to the fact that paroxysms occur between 12 o'clock midnight and 12 o'clock noon, when the organism has gone longest without food. Persons who have been compelled to live upon scanty rations, as soldiers on the march, and others who are unable to get a sufficient amount of food, are subject to relapses following the lessened food supply. A latent infection may become an active one at almost any time by extraordinary strain being thrown upon the organism.

Manson ("Tropical Medicine," p. 7) has this to say: "This much, however, we do know, namely, that physiological strain or vital depression in the host tends to bring about conditions which break up, and that quinine and vital vigour tend to bring about con-

ditions which favour latency."

Case VIII. had a relapse at the time of his midwinter examinations. Medicines were taken and paroxysms stopped, but they again returned at the time of his preparation for final examinations, April 1st and 2nd. Two cases, No. IX. and No. XII., are properly "post-operative" malaria.

Welch ("American System of Practical Medicine," vol. i.), while admitting that reduced conditions of the patient from operation might and do favour recurrences, yet in the first seven years since the opening of John Hopkins Hospital not a single case of post-

operative malaria has occurred.

Writers on surgery have called attention to relapses of this nature, but the literature I have been able to collect has presented no cases where a blood examination was made. I agree with Welch, Thayer and others that the symptoms of malaria following an operation with the temperature yielding to quinine do not justify a diagnosis of post-operative malaria unless the parasites are found in the blood.

Clinical Manifestations of Relapse Uncertain.— Many times the symptoms of a relapse are entirely masked by the presence of some other disease, or the

symptoms are so atypical that one is misled.

Case I. was taken with nausea and vomiting while at school. I did not suspect malaria, but examined his blood only as a routine measure of diagnosis.

During the year 1900 we had in John Sealy Hospital the following cases where the symptoms of malaria were entirely masked: amoebic dysentery, lumbago, mitral regurgitation, and entero-colitis. During the year 1901 I have seen the following: neuritis, asthma, and typhoid fever, saying nothing of a number of cases that have had symptoms of other diseases associated with those of malaria.

Bell and Stewart (Journal of Tropical Medicine, September 2nd, 1901) report nine cases where malaria

seemed to relapse from injuries received.

In Case IX. the patient had suffered more or less

with pain, which I thought was due to other conditions. These symptoms were relieved entirely by the first operation, and the effect of the second operation was to cause a relapse of malaria. The time between the last chills and fever, January 24th, to the manifestation of symptoms, June 30th, was 96 days. I searched the house for anopheles repeatedly, but none were found.

Case XII., who last had a chill in the latter part of July and was treated, showed no evidence of malaria, but the parasite was detected by a blood examination which was made eight days after operation on account of a slight rise in the temperature.

Trousseau observes that the paludal diathesis does not always manifest itself by fevers, but may announce its presence by organic changes of various kinds in the body

The Relation of Acclimatisation and Immunity to Latency.—The Colorado, Brazos, and Trinity riverbasins are known as very malarious districts. I have many times observed that persons after a long residence in these places seem to acquire the power of resisting the action of the parasites while residing in those districts. You may take one of these persons who has had repeated attacks of malarial fever, and who has lived in a malarial atmosphere, and send him to an equally malarious district in company with a person who has lived further north in a non-malarial country; the latter will be struck down, while the former escapes. This generally accepted idea has been well illustrated in Beaumont, which is located on the Neches River. In the early part of 1901 oil was discovered about six miles from the above-named city. The place soon became famous throughout the civilised world as the most wonderful oil-producing region known. Thousands of people flocked there from every section of the country. Almost every new-comer was struck down within a few weeks with malarial fever in some form. Many who have gone there to live say that they do very well after getting acclimatised. While the old citizens of the place have attacks of fever now and then, the percentage is small compared to the new-comers from non-malarial districts.

One of the Texas State prisons is located at Huntsville, where malaria occurs now and then in the town; but when the prisoners are sent out to the State farms on the Brazos River, where malaria is much more intense, they are stricken down with the disease almost immediately. After residence there of several years they seem to become more resistant to the Manson ("Tropical Diseases") attributes disease. this acclimatisation more to education and experience than to any peculiar change that might take place in the organism rendering one less liable to attack. What he says is in most cases true, but not altogether, for prison life is much the same, whether a convict works on a sugar plantation in the malarial basin of the Brazos, or within the confines of a healthful district.

Manson (The Practitioner, March, 1901) holds that repeated infections produce more or less immunity. This, however, does not seem to be applicable to all cases living in malarial districts. In some persons

it seems that each attack only makes them the more susceptible to reinfection or relapses. If repeated infections produce immunity, why are many cases able to live in an intensely malarial place, yet cannot even visit a non-malarial district without having a relapse.

Dr. J. W. McLaughlin, Professor of Medicine in the University of Texas, gives us a striking example of this kind. Mr. Rab, who lives near La Grange, Texas, where almost everyone seemed to be suffering from malarial cachexia from repeated infections of malaria, was not able to visit his relatives at Austin on account of having a relapse every time he did so. Austin is known to be almost free of malaria.

Case V. is a good example of the effect of going into a non-malarial district from one where repeated infections had immunised him against relapses or new infections. After an absence of 40 weeks from his malarial district a relapse came. From the great size of the spleen I cannot help feeling that the parasites had been latent during a year and a half, and that some inflence which we do not understand was operating while in Dallas, but when he reached here this influence ceased to act, hence the relapse.

Among the students who attend the Medical Department of the University of Texas located in Galveston, we have frequent relapses just after entering school. There is said to be a racial immunity. The negro race is known to be much more resistant to infection and relapses than the white people. I am sure from personal observations that they can live along the river basins in excessively malarious districts with impunity, while white people do not dare to go there. It would be an interesting study to make blood examinations of all persons residing in a malarial locality, to determine the matter of racial immunity or latency.

Cases II., X., XIII., XIX., XX., XXI., XXII. and XXIII. illustrate this susceptibility of persons going from a non-malarial district to one that is malarial.

How is Latency Explained?—Thayer ("American System of Practical Medicine," p. 128) says that relapses are clearly proven to be due to the fact that all the parasites have not been destroyed by treatment, or by what Manson calls the "protective power of the human body."

But what is it that enables these parasites to remain inactive, and yet alive, ready at any moment at no fixed period, so far as we know, to begin again their multiplication? Why do the phagocytes, which seem ever to be on the alert to destroy all foreign microorganisms in the circulation, allow the few malarial parasites to calmly rest in the bone marrow, spleen, or lymph glands? Have these phagocytes so much else to do as protective guards of the system, that they do not even attempt the destruction of the latent parasites? If phagocytes are responsible for many spontaneous cures, why is it they do not destroy the sporozooites when they first enter the blood from a suctorial insect? These are difficult questions to answer. Many theories have been advanced attempting to show why we sometimes have these long periods of incubation and latency while in other cases there are only a few days of incubation and no recurrence. Celli gives an instance of the incubation period of quartan infection lasting 47 days.

I have watched repeatedly for sporulation or flagellation of parasites after being taken into the body of a phagocyte, as held by Golgi, but in all my observations the apparent destruction of the included parasite followed. Any chance of further development was destroyed, or at least checked.

Bignami's theory of some resistant spore-form being responsible for latency is to me the most reasonable. A complete discussion of the intricate processes here involved would require more time and space than can be given here, but I cannot refrain from adding a few words in an attempt to give a solution.

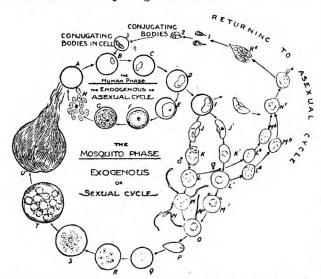


Fig. 1.—Modified schema showing what may possibly take place if bodies are not given an opportunity to flagellate and to fertilise the female bodies. Schema showing the human and mosquito eycles of the malaria parasite. Modified from Blanchard's diagram illustrating life cycle of Coccidium Schubergi. (Manson, Practitioner, March, 1901.) A, Normal red cell; B, C, D, E, red cells containing amoebulæ or myxopods; F, G, H, sporocytes; J', K', L', M', O, macrogametocytes or male gametes; N', N'', microgametes; P, travelling vermicule; Q, young zygote; R, S, zygomeres; T, blastophore; U, mature zygote;  $L^a$ , bodies returning to asexual cycle;  $M^b$ — $R^c$ , suggested phases; 1—3, small bodies that may go to form conjugating bodies.

To get clearly before the reader my views in the shortest space I shall take the liberty of using Manson's "Modified Schema" (The Practitioner, March, 1901) from Blanchard's Diagram. We shall begin with the amœbulæ as seen in the red blood-cells following infection with sporozooites by the mosquito. This endogenous asexual cycle goes on until we have generated a sufficient number of parasites to produce a paroxysm, or in some other way to manifest their presence by symptoms. This phenomenon presents no difficulties. A time comes, variously estimated by different authorities, when the parasite for some reason turns aside from the asexual cycle of segmentation to prepare itself for development outside of the organism. The tertian and quartan forms become "active" and "passive," or make flagellating and final forms. The æstivo-autumnal bodies, instead of going directly into their spherical flagellating and nonflagellating forms, pass into a crescent form which soon assumes an ovoid or spherical shape. Similar

spheres are seen in the tertian and quartan types of parasites. Could it be ascertained just what causes the switching off from asexual to those of sexual ones great strides will have been made towards the solution

of the problem of the duration of latency.

Marchiafava, Bignami, Thayer, and others teach that these crescent bodies can be recognised when they are in a red blood-cell. If this be true, then each sporozooite must have been either a form going on to segmentation or a crescent body going on to the formation of male and female elements. If the kind of body that a sporozooite is to form is not predetermined, then at some stage in its progress some influence must act upon the amœbula to decide its final destiny. This could hardly be true, because, as far as observation goes, these crescent bodies do not begin to appear in the blood for several days after infection. Thayer gives this period as one week or more.

I have many times had recent æstivo-autumnal infections under observation in which neither the crescents nor the young crescent forms could be found, but after several days' treatment these would appear along with the forms which segment. Cases XII., XVI., XVIII., XIX. and XXIII. are good examples.

In my notes and drawings of studies carried on during the past year, I find that ovoids have often been observed to change to crescents; then, without any apparent reason for doing so, would reassume the ovoid shape. In one specimen this change back and forth from an ovoid to a crescent and a crescent to an

ovoid was seen several times.

I believe most authorities hold that crescents never sporulate. There is much evidence in favour of this idea of sporulation of spherical forms that are crescent derived. Still, such authorities as Antolisei, Angelini, Grassi, Polletti, and others have contended that such is the case.

I cannot help believing strongly in Golgi's hypothesis (Ziegler's "Beiträge," 1890, VII., 647) that the crescents represent a form of parasite which undergoes a slow development or "process of internal differentiation, and finally sporulates." Marchiafava and Bignami, however, take the position that these observations of segmentation were processes of disaggregation or vacuolisation due to degeneration of the parasite.

We shall return to our diagram. Now if from some operating cause there occurs a differentiation of asexual segmenting bodies into active sexual bodies, might not this condition be reversed, and bodies that had gone far towards a sexual differentiation undergo some change reverting to an asexual form?

The diagram represents well what occurs in case the blood is withdrawn from the body by the mosquito, or as seen by the microscope. But in case these bodies remain in the circulation when they

reach the crescent, ovoid or spherical stage, what

Flagellation and fertilisation do not take place within the body of man so far as is known, so as to preserve the species. Then would not all the parasites soon become crescents and ovoids in a short time, thus limiting the growth of themselves, unless a mosquito happened along to take up and carry

happens?

forward its development? Nature does not take chances of that kind if she can help it. The presence of these small bodies, marked A in figs. 1 and 2, which apparently came from these crescent-derived spheres, that seemed to sporulate, has caused me to go back to the lower forms of vegetable life for an explanation.

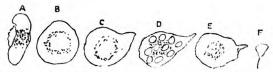


Fig. 2.—Drawings made from personal observation, August 7th, 1901. A—E shows changes that took place in a crescent body during an hour's observation.

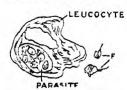


Fig. 3.—Same patient, August 8th, 1901. Personal observation. Malarial parasite before being picked up by leucocyte gave off (or out) two small active bodies, as shown in A, figs. 2 and 3. Those in the phagocyte seem to be identical in structure with those seen outside, fig. 2.

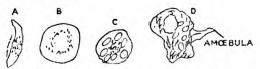


Fig. 4.—Crescent derived sphere apparently segmenting. Picked up by leucocyte (fig. 4, D). Personal observation halfan-hour. Two of the bodies that were seen in (c, fig. 4) could not be made out in the phagocyte.

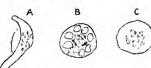


Fig. 5.—September 13th, 1901. Sphere that appeared as a segmenting body, but amoebulæ disappeared, just faded, and suggesting that they were probably vacuoles. (Personal observation.)

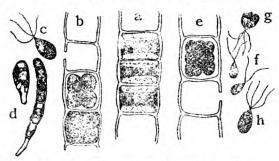


Fig. 6.—Ulothrix; a, vegetative filament; b, development of asexual zoospores; c, zoospore; d, sporelings; e, cell containing gametes; f, gametes; g, conjugation of gametes; h, sexually formed spore.—Davis, Popular Science Monthly, November, 1901.

In fig. 2 A will be seen two of these bodies very much like those in the phagocyte. They are about

one-eighth or one-tenth the size of a red blood-cell, comma-shaped, apparently made up of chromatin and protoplasm.

These bodies are actively motile, and contain oftentimes a granule of pigment. They are certainly not granules of any kind from leucocytes, nor are they Miller's "blood dust." I have repeatedly seen them escape from the crescent-derived spherical body soon after the parasites had begun to show signs of decay. I have tried to stain them, but so far have failed. Their origin and nature may be known, but to me they are not explained.

Davis (Popular Science Monthly, November, 1901), in speaking of the work of Klebs, says: "His studies on Ulothrix are interesting. The zoospores (fig. 5, B) are formed in varying numbers, but usually four or eight in a cell. They are relatively large structures with four cilia. The four ciliate zoospores are never sexual, and they develop new ulothrix filaments like their parent. This simple method of reproduction may be continued for many months, but at times the conditions are such that another form of swarm-spores appears. These elements are much smaller and have two cilia (fig. 4, B). They are gametes, and as a rule fuse readily with one another If conjugation does not take place, the gametes settle down, and in certain instances have been observed slowly germinating; but they develop feeble plants.'

Now what are the causes that make the plant produce asexual zoospores on the one hand and gametes on the other?

The problem thus resolves itself into an inquiry as to the precise environmental influences, the chemical and physical factors affecting the ulothrix filament, whether they are actually able to make the plants form zoospores or not according to certain conditions. It may be that these bodies which I have observed conjugate under proper environmental influences, and thus revert to the asexual cycle as indicated in the diagram.

Ewing ("Clinical Pathology of the Blood") has stained by the Noch and Romanevsky method a number of conjugating bodies of the malarial parasite. Thayer and others have called attention to this frequent conjugation of the amœbulæ of the plasmodium.

There is an interesting discussion of Dr. Ewing's paper in Johns Hopkins Bulletin, April, 1900. While it is pretty generally admitted that conjugation of the parasite occurs, I know of no suggestion that these small conjugating bodies are derived from sexual bodies which are returning to their previous method of development by sporulation. Why this departure from their usual course of development, except it be to continue their existence by conjugation, so as to give the most vigorous offspring obtainable under the circumstances?

Dr. Davis, in *Popular Science Monthly*, further says: "We may feel sure that sexual elements, gametes, have arisen from asexual reproductive cells with immediate relation to, and probably because of, certain environmental factors. In a general way these factors are known to be light, temperature, osmotic pressure and, most important of all, the

chemical nature of the environment, with especial

reference to the kinds of food."

The period of latency in our cases has varied from a few days to one and a half years. It would seem, from a study of these cases, that when treatment is given the asexual amœbulæ, or parasites, are destroyed, leaving behind only those forms that are distinctly sexual. These bodies are very resistant to treatment (see history of cases). These sexual forms apparently produce no symptoms of their presence, but as soon as sporulation and conjugation of the sporozooites takes place, then segmentation follows. The rapidity of these changes depending entirely upon environment, and this environmental condition depends largely upon acclimatisation, immunity, bodily vigour, &c. Hence the importance of making routine examinations of the blood, and if the parasites be present there should be the most energetic treatment begun and continued until every vestige of a parasite disappears. Then, in order to catch other bodies that may result from the segmentation of conjugate forms, quinine ought to be given at intervals ranging from six to twenty-seven days, and continued at these intervals for several months. In a more general way we may say that the duration of the latency depends upon the following, viz.:

(1) It may be that owing to a lack of development of the parasite in sufficient numbers there is not enough toxin liberated at a time to cause symptoms. That such substances of a toxic nature are produced by the parasites themselves, and liberated, or that the disintegration of the red blood-cells so alters the blood circulating through the body that toxic effects

result most investigators admit.

Celli, while arguing strongly in favour of the toxins being generated by the parasites, says: "We have not been able to demonstrate pyrogenic toxin in the serum of the *blood* of those suffering from a malarial attack."

(2) The parasites may become attenuated to such a degree that they do not produce the amount and the kind of toxins to manifest symptoms of their presence, though they may be present in large numbers.

I have often seen cases where the symptoms in no wise seemed commensurate with the number of parasites observed in the specimen of blood. There are a number of examples of attenuation in the growth of bacteria.

- (3) The individual may have acquired a certain immunity, so that he either prevents a sufficient development of the parasites that they do not liberate enough toxins to cause symptoms, or else this immunity has enabled the organism to become resistant to such large amounts of toxins that no symptoms are manifested.
- (4) The attenuation, lack of development, and partial immunity may have been of such a character that the symptoms manifest themselves in an atypical way; or the presence of some disease associated with the malarial infection may so modify the symptoms of malarial fever that they become atypical. In these instances I would be disposed to speak of it as MASKED rather than latent.

Case I.—Simple tertian. Latent 7½ months; symptoms of recurrence. D. O., aged 12. Came to Gal-

veston from Paris, Texas, about November 1st. Had been having tertian chills for several months before coming to Galveston. Got them stopped. Had been in good health until May 15th, 1901, when he was taken with nausea and vomiting. Nausea continued for twenty-four hours. Blood examined the following day, and found to contain tertian parasites. Quinine was given, with complete relief of nausea and fever. Had a recurrence on the 26th day of May. Quinine was again given, and continued. Patient left the city on the 13th of June apparently cured.

the city on the 13th of June apparently cured.

Case II.—Simple tertian, becoming double tertian.

Latent 8½ months. J. M. (c), aged 8. Admitted August 3rd, 1901. Has been in Galveston about three years, except about one month (September, 1900), he was at Chenango, Texas. Had tertian chills and fever a short time after leaving Chenango. Took medicine and got well. June 19th, 1901, chill and fever returned, and recurred every third day for about one week; since then he has had a chill every day. Tertian parasites one-half and full-grown, seen

August 3rd, 1901.

Case III.—Tertian. Relapse after three weeks. Masked. F. M., aged 24. Admitted August 25th, 1900. Previous health good. Drinks beer and whisky. Labourer on farm at Dickinson, Texas. Took sick June 15th. Tertian chills for one week. Took treatment. Chill again after three weeks. No chill since August 15th, but has had fever every other day. Aching of bones and loss of appetite. Tertian parasites.

Case IV.—Double tertian, showing disposition to relapse. F. M., aged 35. Admitted October 18th, 1900. Malaria in Africa in 1892. Lasted sixmonths. Contracted malarial fever in Houston, Texas. Chills began in July. Tertian. Took quinine, and would miss chills for two weeks. October 8th, chills and fever returned, becoming quotidian. Anorexia, headache, and pain in region of spleen. Spleen enlarged. Tertian parasites.

Case V.—Simple tertian. Latent probably 1½ years. J. W., aged 59. Admitted October 27th, 1900. In Galveston four weeks. Came from Dallas, Texas. Rheumatism five years ago. Had malarial fever two years ago, which lasted six months. Was apparently well. Two weeks ago chills returned. Tertian. Spleen enormously enlarged, extending 12 cm. below costal margin in mammary line and to median line of

body. Tertian parasites.

Case VI.—Simple tertian. Latent five months. De L., aged 44. Admitted September 11th, 1901. Born in Mexico. In Texas five months. In Galveston most of the time. Since coming has not left the island. Disease dates back five months. Subject to intense headaches, worse during the past month. Distinct chill on the 12th of September. Tertian parasites.

Case VII.—Double tertian. Latent 5½ months. W. J. F., aged 45. Admitted April 4th, 1901. Has been in Galveston, Texas, twenty-four years. Had malarial fever August, 1900. Tertian. Recurrence about September 29th, 1900. The present attack began March 15th, 1901. Chill, fever and sweat every third day. About April 1st chills began coming every day. Two groups of tertian parasites were found.

Case VIII.—Simple tertian probably. Many relapses. F. A. H., aged 21, medical student. In Texas seven years. In June, 1895, one year after coming to Texas, began having tertian chills. These came every three weeks, then relapses began every 14th and 21st day. Still tertian. In May, 1896, chills returned, and kept up until Christmas after skipping several weeks. In 1897 chills came on in the spring and kept up during the year. 1898 at Ryan, Texas. Many cases of malaria there. Chills kept up until September, 1900. Came to Galveston November 1st, 1900, and chills returned again January, 1901. Again stopped them by quinine. April 1st and 2nd, chills. Took quinine. They now came every 7th to 14th day.

May 3rd, 1901, tertian parasites.

Case IX.—Double tertian. Post-operative malaria. Latency five months. Mrs. W. B. P., Rosenberg, Texas, aged 34. Mother of five children. Has had chills and fever every year. Came to Galveston about October 1st, 1900. Soon after coming she consulted me for a severe attack of dysentery. Numerous amœbæ were found. No note of a blood examination was found. She was treated about ten days, and returned to Rosenberg in November. Was not very well. Suffered pain about body at different times, and felt exceedingly nervous. Had a severe chill on January 17th, 1901. Took large doses of quinine. Had three more third day chills. Had no other chills. though she suffered more or less pain all the time. Very nervous, great lassitude; poor appetite; loss of weight; sallow complexion. She returned to Galveston April 7th. April 10th I was consulted again. No history of chills or fever since January while at Rosenberg. Said she had tingling sensation in limbs, and was nervous and irritable. Poor appetite and no energy. Pain in lower part of abdomen. Examination showed laceration of perineum, lacerated cervix, and some prolapse of uterus. Uterus enlarged and tender. Temperature normal. May 6th chloroform was given, uterus curetted and cervix repaired. Her improvement was rapid. Three weeks later chloroform was given, and perineum repaired. Her recovery was not so rapid. Temperature ranged about 99° F. Removed stitches on the 12th day. Temperature normal. On June 30th she complained of a burning sensation of the skin and pain in joints. July 3rd I found she had a temperature of 101.5° F. She had had no chill or chilliness, and was surprised when I spoke of the fever. A blood examination showed two groups of the tertian parasite.

Case X.—Double tertian. Showing frequent relapses. H. Y., negro, aged 17. Admitted July 2nd, 1901. Health good previous to October 6th, 1900. Went from Galveston to Fort Bend County, on Brazos river, September 22nd. February 6th was taken with a chill, followed by fever and sweat. The chills recurred every third day until December 25th, 1900, although quinine was taken. Missed seven days, then chills recurred for several days. Quinine again. Stopped until April 18th, 1901, since which time they have recurred at irregular intervals, changing June 28th from tertian to double tertian. Half-grown and full-grown tertian, segmenting and flagellating para-

sites demonstrated on July 2nd, 1901.

Case XI.—Simple tertian. Relapses. Great resist-

ance to treatment. W. N., aged 25. Admitted October 4th, 1900. Drinks whisky and beer. Was at work on Brazos river. Went to Mineral Wells and remained there for some time previous to taking sick. Was taken sick May 15th, 1900. Chills and fever every third day up to July 12th. Since then no chills, but has had fever at different times. Often goes three weeks free of fever, then a recurrence of fever every day. Has had fever now about three days, aching of bones and headache. Spleen very much enlarged. During the three days he was in hospital he had no rise of temperature, nor did he have a chill.

Tertian parasites.

Case XII.—Æstivo-autumnal. Latent for about seven weeks. Post-operative malaria. Mrs. O. B., aged 26. Admitted September 6th, 1901. Been in Galveston six years. Born in Texas. Typhoid fever at 14. Very strong and healthy when a girl. Menstruation at 14 normal. Married at 16. One child at 17, and one at 20. Menstruation painful and irregular since last child. Severe pain in back and both iliac regions. No chills or fever since the latter part of July, 1901. Complained of aching all over for more than a month. Appetite poor, drowsy, no energy. September 15th, 1901: æstivo-autumnal ringforms in blood, no leucocytosis. September 16th, 1901: Many crescents and ring-forms. No leucocytosis. Urine normal. Operation on the 7th. One tube and ovary removed by Dr. Ruhl. Dr. J. H. Ruhl, to whom I am indebted for the report of this case, says that the temperature was normal for ten days before operation.

Case XIII.—Æstivo-autumnal, showing latency and resistance to treatment. G. B., aged 42. Admitted September 9th, 1901. Has lived in Galveston twelve years. Went to Denison, Texas, in March, and remained there until June. Went to Beaumont July 7th, and remained there until August 24th. Returned to Galveston September 3rd. Previous health good. Took sick with fever September 6th, followed by sweats three hours later. No chill at any time. Backache and pain in hips. Æstivo-autumnal parasites. Small intracorpuscular æstivo-autumnal bodies on the 9th, 11th, and 16th. Crescent bodies seen first on September 16th. Still present on October 3rd,

when he left the hospital.

Case XIV.—Æstivo autumnal. Latent one year, and relapse again after one month. J. A., aged 29. Admitted September 15th, 1901. Previous residence Cleveland, Texas. Left there and came to Galveston May 20th. Had rheumatism three years ago. Had malaria fever in July, 1900. Got well apparently. Had another chill July 1st, 1901. Took quinine, and was well for one month. August 10th, chills returned, occurring every day. High fever followed by sweating August 16th. Blood examination showed æstivo-autumnal parasites.

Case XV.—Æstivo-autumnal. Latency fifty-two days. D. C., aged 34. Admitted September 19th, 1901. Went to Beaumont about July 10th, 1901. After being there two weeks, he began to have diarrhoea and fever. Took quinine and got all right. Came back to Galveston in August. September 15th was taken with a chill, followed by fever. Æstivo-autumnal parasites were demonstrated on the 16th, 17th, 18th, and 19th.

Case XVI.—Æstivo-autumnal. Latent six months. Another relapse. Z. A., aged 35. Admitted September 20th, 1901. Was in Dickinson during February, March and April. Came to Galveston May 20th, and remained until July 20th, when he went to Lampasas, Texas. While there in the first part of August had chills and fever for eight days. Returned to Galveston August 8th. Took medicine and remained well until September 6th, when he began having fever, pains through body, and once in a while chilly sensations. Parasite of æstivo-autumnal type was found on September 21st, but no crescents or ovoids. Crescents were present on September 27th. Patient left hospital September 29th, feeling well. Temperature had never reached 98 6° F. until the day of leaving, although under constant influence of quinine.

Case XVII.—Æstivo-autumnal. Masked. Typhoid fever. L. M., aged 8. Admitted March 3rd, 1901. In Galveston one year. Was exposed to bad weather the last day of December, 1900. Remained in wet clothes at school all day. Had severe chill followed by fever. Was better next day, and returned to school. After two days was not well, and went to bed. Was in bed only a part of the time. Finally, about three weeks ago was put to bed. A doctor was called and made a diagnosis of relapse of typhoid fever. Patient has been having fever, headache, gastric pains, and a slight diarrhœa. Spleen much enlarged and tender. Abdomen distended. Crescents. Widal reaction "partial." Red cells 3,071,000. White 28,200.

Diagnosis of typhoid and malaria.

Case XVIII.—Æstivo-autumnal. Latent 6½ months.

J. C., age 36. Admitted April 15th, 1901. In Galveston four years. Probably contracted malaria in western part of Galveston. Was in the hospital in July, 1900, suffering from æstivo-autumnal malaria.¹ Went out free of symptoms, though parasites were still present. Chills began February 15th, 1901. Fever and sweat every other day. Took chill tonic and missed until March 19th, when from that time on they became quotidian. April 15th, intra- and extra-corpuscular bodies, ovoids, crescents and flagellated parasites. Note.—No crescents or ovoids were seen

during his stay in hospital in July, 1900.

Case XIX. — Æstivo-autumnal parasites present eleven days after temperature reached normal. P. Y., aged 25. Admitted July 6th, 1901. About June 6th went to Cleveland, Texas. Worked in river bottom and drank water from shallow well. Took sick a short time after going there. Pain in head and knees. Vomiting. Spleen enlarged. Small bodies of æstivo-autumnal parasites found on July 7th. Parasites were demonstrated in blood constantly, although temperature was normal from July 18th to the 29th, when he left the hospital. A large number of ovoids and crescents were seen on this date.

Case XX.—Æstivo-autumnal. Incubation apparently five months. S. L., aged 26. Admitted July 4th, 1901. Worked in Cleveland, Texas, five months ago, and drank river water. No previous diseases. June 24th began to have abdominal pain, headache, fever, chilli-

ness, diarrhea and vomiting. Has been very sick since. Spleen enlarged. Æstivo-autumnal parasites.

Case XXI.—Æstivo-autumnal. Incubation twentyfour days. Relapse. J. K., aged 40. Admitted
August 16th, 1901. Had typhoid and malarial fever
about fifteen years ago. Rheumatism ten years ago.
Health since then has been good. Has been in Galveston about seven years. Has occasionally visited
other places in the State. June 13th patient went to
Cleveland, Texas. Slept on the bank of the river.
Most of the men working there had malarial fever.
July 7th had a chill, fever and sweat. Took medicine.
Had tertian paroxysms for about one week; then
chill came on every day for two or three days. After
this, had no more chills until August 22nd. Blood
examined on the day of admission showed no malarial
parasites. On the 24th blood was examined again,
and showed the ring-shaped æstivo-autumnal bodies.
Slight chill on the 25th.

Case XXII.—Æstivo-autumnal. Showing parasites present with a normal temperature. M. J., aged 29. Admitted August 17th, 1901. Rheumatism at different times during the past five years. June 19th, patient went to Bellville, Texas. Had chills and fever while there. Came back to Galveston the latter part of August, 1900. Had chills and fever off and on during the winter. They would stop while taking quinine, but would soon return. About May 25th, 1901, went to work on Trinity River. Was there until July 15th, when he went to Beaumont Hespital for the trouble. Was there until August 16th, when

he came to Galveston.

Blood examination on August 17th; intracorpuscular bodies and crescents. Blood examined at intervals of two days showed parasites present each time. September 23rd parasites present: intracorpuscular bodies of æstivo-autumnal fever. Tempera-

ture had been normal for thirteen days.

Case XXIII. — Æstivo - autumnal. Latent 21 R. J. K., aged 45. Admitted September months.23rd, 1901. Syphilis five years ago. Otherwise health good. Went to Beaumont first part of April, Was taken with dizziness in head in early part of May. Two weeks later had a distinct chill and fever. Came every third day. Took medicine and felt well. Left Beaumont and returned to Galveston latter part of June. Continued well until September 12th; began to have pains through body, headache, and general malaise. On the 19th, was taken with a decided chill followed by fever. Fever continues. Chill again on the 22nd, 23rd, and 24th. Since then he has had no chill, nor has there been a rise of temperature above normal. Small æstivoautumnal parasites present on the 23rd and 24th. Ovoids and crescents seen first on September 25th, and again on the 27th. Intracorpuscular ring bodies and crescents abundant on the 27th.

[Owing to lack of space the sketch maps and the temperature charts illustrating this interesting paper could not be produced.—Ed.  $J.\ T.\ M.$ ]

<sup>&</sup>lt;sup>1</sup> Case XVIII. was previously reported by the writer ("Malarial Nephritis," Trans. U.S. Med. Association, 1901).

# PRINCIPLES DETERMINING THE GEO-GRAPHICAL DISTRIBUTION OF DISEASE.

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The study of disease in relation to surrounding conditions has at all times been a subject of earnest inquiry, and of this we have ample evidence throughout medical literature, from the early books of Hippocrates, περὶ ἀέρων, ὕδατων, τόπων, το Hirsch's monumental work on geographical and historical pathology. However, notwithstanding the mass of materials collected, especially with a view to the elucidation of the etiology of disease, the laws which control geographical pathology have not yet been formulated, or at any rate they have not been settled in accordance with recent science. Indeed, the principles which regulate the distribution of disease, and determine the rise and fall of epidemics, could not have been conceived without the light of the evolution theory, and a study of the distribution of species founded on plant and animal ecology.

To thoroughly apprehend the laws which govern

To thoroughly apprehend the laws which govern the geographical distribution of disease, it is necessary to have a clear notion of the nature of disease. Unfortunately, whilst the etiology of certain maladies has been satisfactorily worked out, that of many

others is still shrouded in obscurity.

Undoubtedly, the greatest advance ever achieved in medicine has been the establishment of the parasitic theory. The belief in a living cause or contagium vivum is very old, but it is only quite recently that it has been demonstrated. However, notwithstanding the discovery of specific organisms in a number of widely different disorders, formerly attributed to astrological, meteorological, or chemical causes, the all-important part played by parasitism in disease causation does not seem to have been fully grasped. It is true that some diseases, such as measles, scarlet fever, small-pox, yellow fever, have long been classed among the parasitic diseases, merely on account of analogy with similar disorders, the parasitic nature of which has been fully demonstrated; but the analogy has not been extended beyond a certain group of diseases called "infectious diseases."

In medicine, as in all other branches of knowledge, there has always been a strong aversion to relinquish the old orthodox theories, and, indeed, far more energy is spent in opposing a new idea than in advancing it. One of the diseases earliest acknowledged to be of parasitic origin was scabies. The Arab physicians of the twelfth century had a clear notion of its etiology, and, in the writings of Avenzoar we find the Sarcoptes clearly mentioned; but, notwithstanding the repeated observations of numerous naturalists, the psoric acarus was utterly ignored by medical men, who continued to explain the disease by the humoral theories up to the year 1834, when a Corsican student, Francesco Renuccio, hearing the existence of the acarus denied at the Saint-Louis Hospital in Paris, proposed to show it forthwith, and extracted it from the epidermis of a patient with the point of a needle, as he had seen the peasant women of his country do many a time.

Almost every disease has a similar history. A recent example is that of the opposition offered to the discovery of the hæmamæbidæ of the intermittent fevers, and to the demonstration that these parasites are propagated by certain species of mosquitoes which subserve them as definitive hosts.

The classification of diseases in modern text-books is very confusing and misleading. Whilst two sections are usually set apart, one for diseases due to parasitic worms, insects and mites, and the other for certain diseases called "infectious," and now known, or believed to be caused by parasitic protozoa, fungi, or bacteria, all other diseases are still grouped in the old way, according to the several organs or systems of which the body is composed.

Fig. 1.—Sarcoptes scabiei, ovigerous female, seen on the ventral surface. Magnified 160 diameters.

If diseases were arranged according to their etiological factors, much confusing repetition would be avoided, the absurdity of certain old theories would be evident, and the student would acquire a more lucid and definite idea of the nature and mechanism of disease. After a cursory chapter on the injuries that may arise from lightning, fire, frost, or poisons, from the weapons of man, the bite of wild animals, or the stroke of venomous snakes, the diseases caused by the parasitism of insects, acari, leeches, nematodes, cestodes, trematodes, protozoa, fungi and bacteria, should follow successively in a natural biological order. Of course, it would be difficult just now to place satisfactorily those diseases of obscure etiology which still bear the old labels of faulty metabolism,

alcoholic excess, or exposure to cold and heat. But we should not forget that all the diseases now known to be of parasitic origin were, at one time, erro-

neously ascribed to these very same causes.

For generations physicians have considered cold to be the prima causa of pneumonia and pleurisy. The highest incidence of pneumonia in the winter and spring months, its occurrence after a wetting, or a chill due to some unusual exposure, its constant and severe initial rigor, seemed very obvious indications of the correctness of such a theory. Now we know that lobar pneumonia is due to Micrococcus lanceolatus, and that broncho-pneumonia and pleurisy may be caused by various parasites, such as Bacillus tuberculosis, Micrococcus lanceolatus, or Streptococcus pyogenes.

Rheumatic fever is another disease which was believed to be due essentially to cold. Now it is classed almost unanimously amongst the infectious diseases, although no positive proof has as yet been offered of the constant association of any special

micro-organism with the disease.

It would occupy too much space to enumerate all the diseases which have been attributed to cold; but, in order to prove the absurdity of this theory, I will mention that even in such a progressive text-book as Osler's "Principles and Practice of Medicine," apart from frost-bites and chilblains, cold is still given as the universal cause of arthritis deformans, chronic rheumatism, acute tonsillitis, catarrhal jaundice, rheumatic peritonitis, coryza, acute laryngitis, acute bronchitis, idiopathic pericarditis, acute endocarditis, Bright's disease, locomotor ataxia, progressive muscular atrophy, infantile paralysis, ataxic paraplegia, acute myelitis, neuritis and neuralgia.

It may, perhaps, seem unwise to question the universally accepted etiology of such diseases as scurvy, gout, or diabetes; but there are numerous conditions in the natural history of these diseases which cannot be explained by the prevailing chemical theories, and

which are distinctly suggestive of parasitism.

I need not discuss the etiology of scurvy, because its specific nature has already been very ably advanced. In parts of Russia scurvy is endemic, assuming at certain seasons epidemic proportions, and Russian authorities are almost unanimous in regarding it as infectious. The infectious origin of diabetes has also been suggested, and chiefly on the grounds

of conjugal diabetes.

I will mention certain facts which, to my mind, suggest the parasitic nature of gout. Gout has a wide geographical distribution, but it is absent in many places. It is quite unknown in Lapland, in Iceland, in the Faröe Islands, in Ceylon, in New Zealand, and the Hawaiian Islands (Hirsch). It seems to be absent from the greater part of the African Continent and from Australia (Hirsch). In America, it is a comparatively rare disease, but it has become more common of recent years in the United States (Osler). It is more frequent in England than in Germany, but although rare in Leipsic it is rather common in Bavaria (Strümpell). The prevalence of gout differs considerably at various places within its endemic areas, quite irrespective of the conditions believed to be most favourable to its occurrence: it has completely dis-

appeared from certain districts without any apparent reason; in others, it has greatly fluctuated at different times. In its typical form, gout is a paroxysmal disease. In the interval, the patient feels quite well, and, as Aretæus remarked, "He may have won the race at the Olympian games." A patient may have three or four attacks in a year, or the fit, as it is called, may not recur for several years. The characteristic uratic deposits of gout do not occur simultaneously in all the joints, but successively, and each paroxysm is connected with a peculiar inflammatory process in one or other joint, and the subsequent deposit of crystals in the affected joint.

Excess of uric acid in the blood is by no means peculiar to gout; it may occur in leukæmia, chlorosis, and other diseases which do not present any of the other symptoms peculiar to gout. Therefore, uric acid cannot be regarded as the cause of gout any more

than lactic acid that of rheumatic fever.

Gout, or disorders indistinguishable from the gout of man, are met with in hogs, parrots, fowls, ostriches, and reptiles, all of which cannot be said to have been influenced by the "evils of civilisation," to which Balfour and others ascribe the "gouty diathesis."

The great Boerhaave believed gout to be a communicable disease, and Van Swieten, in his commentaries on the "Aphorisms," adduces in evidence that wives who had tended their gouty husbands day and night were ultimately attacked by the disease. The communicability of diseases varies greatly with the different conditions necessary to their propagation. Certainly, one would not compare the infectiousness of gout to that of dengue or influenza, but to that of diseases long considered as non-infectious, such as

leprosy and tuberculosis.

Great stress has been laid at all times, on the hereditary transmission of gout. But, in the light of modern knowledge, inheritance of disease spells infection. We do not believe any longer that syphilis, tuberculosis, or leprosy are hereditary diseases in the strict scientific sense of the word "hereditary," which means the development of characters existing potentially within the protoplasm of the first formative units, but that they are transmitted to the fœtus during the period of gestation. Hauser, in his excellent study of hereditary tuberculosis, reached the conclusion that there were really no satisfactory instances on record of the transmission of tuberculosis from parent to child, except in a few cases in which the mother was suffering from miliary tuberculosis during pregnancy. Experimentation has clearly proved that a father suffering from tuberculosis does not transmit the disease to his offspring by a healthy Authors have often remarked upon the frequency with which gout affecting grand-parents would skip one generation to reappear in the grandchildren. A similar fact is noticed in tuberculosis and other diseases known to be of parasitic origin. It may be explained by an inherited immunity sufficient to protect the children, but not sufficiently permanent to protect the second generation.

At one time, when nothing was known of their etiology, intestinal worms were likewise believed to be hereditary, and the old physicians spoke of a "verminous diathesis" just as gravely as we now talk of a "gouty diathesis."

Another very interesting disease which can be better explained by parasitism than in any other way, is calculosis. The geographical distribution of urinary calculus is somewhat known in a general way. It is very wide but most unequal. In certain places the disease is very common, in others it is quite unknown. Thus, it is almost unknown in Ireland, while it is very common in Norfolk, where it has been ascribed to the use of Norfolk dumplings. At one time, calculosis was ascribed to a cold and damp climate, but its prevalence in Syria, Persia, India and China, and its extreme rarity in Norway, Sweden and Alaska, were opposed to such a theory. Its supposed relation to chalk soil was likewise contradicted by the facts of geographical distribution, and physicians were obliged to excogitate a lithic diathesis analogous to that of

In favour of the parasitic theory we have already a number of facts. Thus, calculosis is a special feature of Bilharzia disease, and the nucleus of the calculi is usually formed by the ova of the parasite. In hepatic

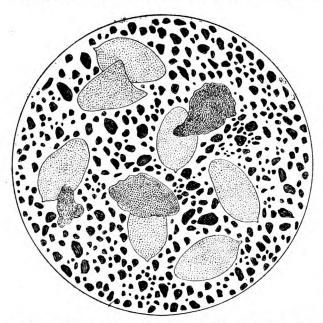


Fig. 2.—Section through nucleus of urinary calculus containing ova of Schistosoma hæmatobium.

distomiasis biliary calculi are frequently formed, and they may contain one or more flukes, as was observed by Simonds and Brouisson. Recently Welch and others have demonstrated the presence of micro-organisms in the centre of gall-stones, and thus explained the frequent association of cholelithiasis with typhoid and other specific fevers. Gilbert and Fournier succeeded in producing gall-stones by injecting micro-organisms into the gall-bladder of animals. Calculosis is a process very similar to that of calcification which occurs within the tissues round encysted parasites, such as trichinæ and bladderworms.

I need hardly state that in recent years parasitism

has completely revolutionised the etiology of skin diseases. In neurology, parasitism is perhaps less apparent, but surely no one can fail to perceive that the recognition of the specific agents of tuberculosis, leprosy and syphilis, in neuro-pathology, points to a radical modification of our conceptions of the etiology of nervous diseases.

Another great group of diseases which must be mentioned is that of tumours. Already the granulomata have been ascribed to specific parasites, such as the fungus of actinomycosis, or the bacilli of glanders and tuberculosis, and recent investigations point to certain protozoa as the specific organisms of carcinomata and sarcoma. But the etiology of the other neoplasia is still hampered by untenable theories, such as Cohnheim's theory of embryonic residues.

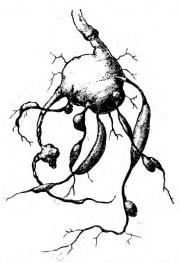


Fig. 3.-Root of young turnip with clubs. One-half natural

The old theories would have been abandoned sooner, perhaps, if the causation of tumours had been studied in the wider field of comparative pathology. In plants we meet with analogous growths called cecidia or galls, of which the "oak-apples" and "witches' brooms" are well-known examples. Botanists have already classified more than 1,600 different gall-structures, but it is not long since their etiology was discovered. At one time, galls were believed to be caused by elves and witches, later they were ascribed to unusual meteorological conditions; now, at last, they are known to be caused by parasites, which may be fungi, mites or insects. Galls vary greatly in size, shape and structure; some are solid, others hollow, like cystic tumours; some are rapidly deadly to the host-plant, others are harmless, and may fall off in autumn, like ripe fruit. Some are limited to small leaf-areas, and are formed by hypertrophied epidermal cells, which grow out exactly like warts; others modify whole branches, and alter the internal structure as well as the outward appearance of the host-plant.

The same species of parasite produces very similar, but slightly different galls, on different plants, while different parasites produce very dissimilar galls on the same plant. Some oaks, for instance, may bear as many as thirty different forms of gall produced by as

many kinds of gall-wasps.

Naturalists have been greatly puzzled as to the actual process of gall formation. Now, they believe that the active cell-division which produces the gall is incited by some kind of substance excreted by the In galls produced by insects, the eggs parasite. deposited in the plant tissue, or attached to it, are incapable of inciting gall formation. The formation of the cecidium commences after the hatching of the larva, and invariably ceases if the animal dies. The abnormal growth is probably an effort to repair injury. It is well known that the largest and best looking pears in orchards in the early summer are often The larvæ stimulate the swarming with larvæ. growth of the young pears, causing a spurious appearance of unusual health and vigour. Parasitic fungi, which attack leaves or roots, usually cause great distention of the cells they affect. In the club-root disease of turnips, commonly called "fingers-and-toes," the swellings are due to the enormous enlargement of the cells containing the parasite (Plasmodiophora brassicæ).

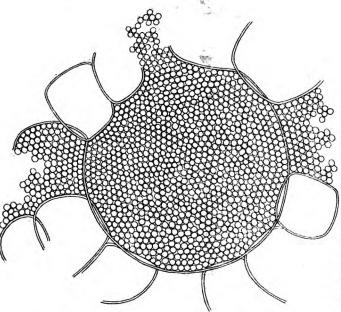


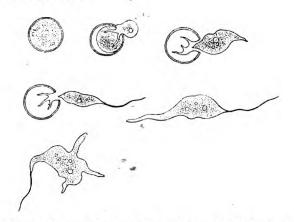
Fig. 4.—Spores of *Plasmodiophora brassica*, Wor., seen within the cells of turnip-root. Enlarged 400 diameters.

The comparison between the gall-structures of plants and animal tumours is not so far-fetched as might appear at first sight; anyhow, we should not forget that some of John Hunter's best work upon the diseases of bones was illustrated by the similar changes he met with in diseased tree-branches and twigs.

With a view to the etiology of neoplasia in animal pathology, it is important to note that some of the gall-producing fungi have two alternative stages of development. Each one of these two stages is spent on a different host; is characterised by a difference in the nature of the spore-producing organs; and induces

a very different kind of hypertrophy in the respective host-plant.

The importance of parasitism in the causation of disease becomes more and more apparent the wider the field we survey. Recent work in tropical medicine has added numerous examples, and has prompted the re-examination of analogous diseases at home. The study of the diseases of animals and plants has evidenced even more forcibly the pathogenic rôle of parasitism, and has overthrown a number of speculations which seemed reasonable enough when limited to human pathology, but which appear absurdly erroneous when extended to the same or analogous diseases in animals and plants. For example, alcoholism as the cause of certain diseases common to men and cattle!



 ${\bf Fig.\,5.-Spores\,of}\,Plasmodiophora\,brassicx, {\bf Wor., germinating}\, and\, producing\, amceba-like\, zoospores.$ 

Whatever be the true causation of the so-called "constitutional diseases" and of other diseases not assigned to parasitism, their geographical distribution seems to be controlled by the same principles which govern the distribution of diseases known to be of parasitic origin.

If diseases are caused by parasitic organisms it is evident that to understand the origin and distribution of diseases we must study the laws and conditions of parasitism. At one time it was thought that parasites had always existed as parasites, but innumerable facts in the morphology and embryology of parasites prove that the parasitic habit is gradually acquired, and that all parasites must have evolved from nonparasitic forms. A number of parasites are strictly confined to certain plants or animals as hosts; it is therefore evident that they must have originated after the occurrence of the host-species either by adaptation from free-living forms or from parasitic species on other hosts; and following this back to its origin, we must ultimately arrive at a free form as the source. In many cases the line of evolution is quite apparent; as, for instance, the gradation between comparatively free and fixed bird-lice (Mallophaga).

An example which shows how parasitic habits may be acquired, is that of the Kea (Nestor notabilis), one of the long-beaked parrots peculiar to New Zealand. Before the introduction of sheep in New Zealand, the Kea fed on the juices of plants, but lately it has

become a sheep-killer. In 1868, it was noticed that the Kea was in the habit of visiting the carcases of sheep, which were hung up for consumption, and eating the fat round the kidneys. The Kea has now become a formidable foe to the flocks of New Zealand, for it attacks the living sheep, perches on their backs, tears away the skin and digs out the kidney fat, thus causing their death.



Fig. 6.—Nestor notabilis.

The natural tendency of an animal once started in the direction of parasitism is to become more and more parasitic in habit, and with this habit the structure of its body will gradually become modified. The modification is usually considered a degeneration, because it results in the loss or atrophy of certain

structures which have become useless in a sedentary, non-competitive parasitic life; but it really is a limitation in certain directions, with a progressive elaboration in others. The structure of an animal is as inevitably associated with its functions and adaptations as the state of HO, with

temperature. Many parasites have become so greatly simplified that they present a very different appearance from those animals with which we know them to be closely related. Thus the linguatulæ, which belong to the class of the aracmida, were believed to be worms, until the study of their embryology placed them amongst the arthropoda. Demodex folliculorum, found in the skin of the human face, is a degenerate spider; its eight legs have become mere stumps, and the body is elongated like that of a worm. A striking example of modification due to parasitism is that of a crusta-

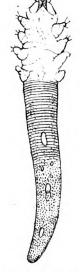


Fig. 7.— Demodex folliculorum, var.

sacculina is an active, free-swimming larva, much like those of other shrimp-like animals. But the adult which lives as a parasite on the abdomen of hermitcrabs, is a mere sac filled with eggs, and provided with

delicate root-like processes, which penetrate the body of the crab host, and absorb nutriment exactly like the haustoria or roots of parasitic plants.

As an example of the gradual reduction of organs through parasitic habits, may be mentioned that of the wings in forest flies. Hippobosca equina which infests horses and oxen, has fully-developed wings; another species Stenopteryx hirudinis, which occurs on swallows, has narrow sickle-shaped wings scarcely fitted for flight. A third species Lipoptena cervi,

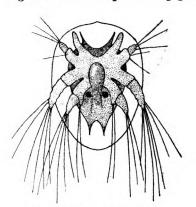


Fig. 8.-Larva of Sacculina

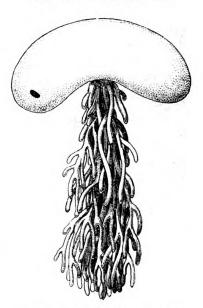


Fig. 9.—Adult Sacculina (female).

which is found on deer, is provided with wings upon issuing from the pupa case; but soon after settling on its host it drops them, by fracturing them at the base. A fourth species, the so-called sheep-tick (Melophagus ovinus), is entirely wingless from its birth. We thus get in this family a series of forms starting with the fully-winged horse-fly, and leading through the swallow-fly with reduced wings, and the deer-fly which can cast its wings, to the sheep-fly, which has entirely lost these organs.

Many parasites have become so specialised, so greatly modified and changed, in order to adapt them-

selves to certain hosts and to certain conditions of life, that they have become absolutely dependent upon such hosts and the presence of such conditions for their existence.

Sometimes the limitation to certain hosts is not associated with any apparent modification, as is the case with many insects which depend exclusively on certain food-plants.

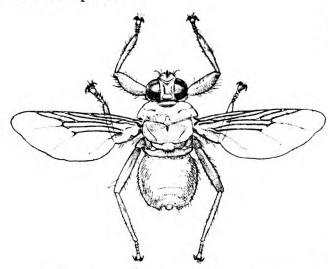


Fig. 10.-Hippobosca equina. Magnified 4 diameters.

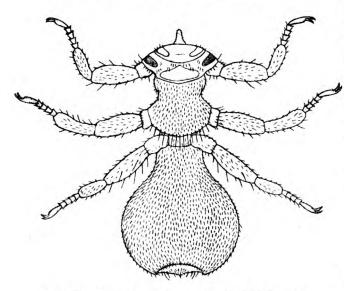


Fig. 11.—Melophagus orinus. Magnified 10 diameters.

An example, which shows how such limitation may arise, is that of the Stem Eel-worm (Tylenchus devastatrix). This nematode lives and reproduces in various cultivated plants, such as rye, oats, stored onions, hyacinths, buck-wheat, potatoes, and clover, and in wild plants such as Poa annua, Anthoxanthum odoratum, Dipsacus silvestris, and Polygonum persicaria, but not to the same extent in all. However, Eel-worms, of which the progenitors have developed for many years exclusively in rye and buck-wheat, are

not easily transferred to another kind of plant, or at any rate, they do not multiply vigorously there.

An interesting example of the dependence of species on species is that of Vedalia cardinalis. A few years ago a pest called the cottony-cushion scale (Iceria purchasi) was introduced into California from Australia on young orange trees. This pest soon increased to such an extent that it threatened to completely destroy the great orange orchards of California. Artificial remedies having proved useless, a well-known entomologist, Dr. C. V. Riley, was sent to Australia to find out if this scale insect had not some special



Fig. 12.-Tylenchus devastatrix. Magnified 200 diameters.

natural enemy in its native country. He found that in Australia a certain species of ladybird (Vedalia cardinalis) attacked and fed on the cottony-cushion scales and kept them in check. Some of these beetles were brought to California and released in a scaleinfected orchard. Finding plenty of food the Vedalias throve, and became so numerous and so widely distributed that the scales began to diminish perceptibly, and in a few years were almost wiped out. But the disappearance of the scales was followed by that of the vedalia, and it was then discovered that these coccinellidæ fed on cottony-cushion scales, and could not live without the latter. With the disappearance of the predaceous lady-birds, the scales began to increase again in various parts of the State; and now, in order to have a stock of redaliæ on hand in California, it is necessary to keep some colonies of the cottony-cushion scale to serve as food.

(To be continued.)

Mosquito Larvæ and Malaria .- In the Archives de Médicine Navale, September and October, Paris, 1901, Dr. Palusne de Champeaux, from experiences gained during two military expeditions in Curamance, a country lying on the left bank of the Gambia, states: that the anopheles mosquitoes may cause malarial infection by their bite, and also that by drinking stagnant waters containing anopheles larvæ may the disease be spread. On what grounds Dr. de Champeaux arrives at the latter conclusion is not stated. He is averse to the administration of quinine as a prophylactic against malaria when no prodromal symptoms are present. It would be interesting to know why quinine prophylaxis is objected to and what are the prodromal symptoms which betoken the encroachment of the disease.

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THE

## Journal of Tropical Medicine

MARCH 15, 1902.

### PRINCIPLES DETERMINING THE GEOGRAPHICAL DISTRIBUTION OF DISEASE.

WE feel sure that the scientific appreciation of the new principles which Dr. Sambon has so kindly, and with so much originality and wealth of illustration, expounded, would contribute more to the prevention of disease than the blind, groping, very expensive, and, too often absolutely futile, efforts our sanitary authorities are wont to indulge in, more especially in tropical countries. We commend Dr. Sambon's paper to all interested in the philosophical study of disease and practice of medicine.

Some minds would have us draw a sharp line between the practical and the scientific in medicine; they would have us believe that the two are incompatible; that a scientific physician or surgeon cannot possibly be a practical physi-

cian or surgeon. Indeed, it is not unusual to attempt the detraction of a brother practitioner by alleging or hinting that although he may be expert with his microscope or test tube, even on that very account, he cannot prescribe for or treat successfully ordinary diseases. Exactly the same feeling exists in some minds as regards the sanitarian; that the man learned in germs cannot possibly know much about the operation of a patent water-closet. This attitude of mind is a very wrong and very foolish one. The mind that can grasp the principles of a science is just as likely, nay more likely than any other, to be able to apply that science. These remarks are elicited by the interesting paper by Dr. Sambon on the "Principles determining the Geographical Distribution of Disease," the first instalment of which appears in our present issue.

### Obituary.

#### DR. PATRICK THURBURN MANSON, M.B.LOND.

On Saturday, March 15th, news reached London from Christmas Island that Dr. Patrick Thurburn Manson, M.B.Lond., eldest son of Dr. Patrick Manson, C.M.G., F.R.S., met with a fatal accident shortly after arrival at Christmas Island.

We have only time, before going to press, to mention the fact, and to add our sincere sympathy with his parents and relations in their bereavement.

It is but two months since Dr. Thurburn Manson left London for Christmas Island, off the coast of Java, to take part in the scientific investigation of Beri-beri.

After a brilliant career as a student at Guy's Hospital he graduated M.B.Lond., and subsequent to graduation prosecuted his pathological studies at Aberdeen, and tropical diseases at the School of Tropical Medicine, London.

He left London full of enthusiasm for the work before him, and it is sad to think that so promising a career has been so suddenly closed.

A more complete account of his work and career will be given in our next issue.

## Hews and Hotes.

CHOLERA IN CANTON.—A severe outbreak of cholera is reported to be raging in Canton. So far Hong Kong has escaped infection, but the traffic between the two ports is so large and so constant that a spread of the disease to Hong Kong is to be dreaded.

### Rebiel.

THE MEDICAL ANNUAL, 1902. Bristol: John Wright and Co.

This useful publication has reached its twentieth year of issue. We congratulate Messrs. Wright and Co. upon their success, and we are sure all members of the medical profession thank them for one of the most highly appreciated of our medical publications. The present issue is equal to, and we think is fairly entitled to be considered an improvement upon, any of its predecessors. The work is profusely illustrated, and diagrams and charts help to render the descriptions of diseases interesting and educative.

Part I., "The Dictionary of Materia Medica and Therapeutics," by Dr. Wm. Murrel, along with which is an article on "Toxins and Anti-Toxins," by Dr. Wm. Murrell and Dr. Joseph McFarland, is of the highest value. The most recent drugs are fully discussed; and to the practitioner in the tropics the use of quinine in enteric fever and the use of tannigen in intestinal flux, together with the whole subject of toxins and anti-toxins, will prove interesting reading.

Part II., "The Dictionary of Medicine and Surgery," has several articles of special value. The subject of arsenical poisoning, in view of the resemblance of the symptoms induced to those of beri-beri, will be read by practitioners in the tropics who are acquainted with beri-beri with close attention. Tropical diseases are dealt with by Mr. Cantlie. An excellent article on "Vision," by Mr. A. St. Clair Buxton, deals with "errors of refraction and accommodation." The article is written to help those who possibly have little opportunity of rendering themselves familiar with the practical side of refraction, and the writer gives a clear and simple exposition of the subject—just what is wanted by medical practitioners.

Part III. deals principally with sanitation, and the closing chapter, entitled "A Review of New Inventions and Pharmaceutical and Dietetic Articles," is

of great practical value.

The Medical Annual for 1902 must form a part of every practitioner's library if he is to keep himself informed concerning the recent advances in medicine and surgery.

### Current Miterature.

A Phase in the History of Cholera in India. By Andrew Duncan, M.D., B.S.(Lond.), F.R.C.S., M.R.C.P.

Physician to Seamen's Hospital Society; Joint Lecturer on Tropical Medicine, London School of Tropical Medicine; Physician to Westminster General Dispensary.

(Continued from p. 79.)

(9) and (10) The "IPSE DIXIT" AND EXPERIENCE OF INDIA ARGUMENTS.—These two arguments may be examined together. In his last brochure on cholera, published in 1884, the Sanitary Commissioner with the Government of India claims to set forth "a few

of the great facts showing what has been the experience of India as regards the disease.' work in question the experience of India is then claimed as showing that human intercourse is never connected with the diffusion of cholera. But is this the experience of India? India as a whole is made up of the Madras and Bombay Presidencies, and of the Bengal Presidency, comprising Assam, Bengal, N.W.P., and the Punjab. Now for the facts. Dr. Cornish, the Surgeon-General of Madras, declared at the inauguration of the Madras Branch of the British Medical Association, that "he was bound to say there that all his individual experience, extending over thirty years, would lead him to deal with the epidemic form of cholera as favoured in its diffusion under certain circumstances by human intercourse." Surgeon-General M. C. Burnell, his immediate successor, at the annual meeting of the same society, declared that his opinion, after "forty years' experience" of the disease, was that water contaminated with cholera dejecta was the cause of cholera epidemics. Surgeon-General Moore, of the Bombay Presidency, has placed on record not only his belief in human intercourse, but even that the disease can be carried by flies. Surgeon-General Townsend for the Central Provinces and the Punjab, and Surgeon-General Payne for Bengal, and Surgeon-General De Renzy for Assam and the Punjab, have expressed the same view. Surgeon-Major Geoffrey Hall, of the N.W.P., at a debate on the disease at the N.W.P. Branch of the B.M.A., said that he had never met a man who agreed with the views of the Sanitary Commissioner for 1879. Surgeon-Major Deakin, of the N.W.P. held the same opinion. Surgeon-General T. Murray addressed an inquiry to 481 medical officers as to the transference of the disease by direct intercourse; 363 answered in the affirmative. Again, Surgeon-General Irvine for Assam believed in human intercourse. Well, we have thus shown that the opinion for Madras, Bombay, the Central Provinces, Assam, Bengal, N.W.P., and the Punjab is in favour of propagation by human intercourse. There does not remain, in fact, much of The above testimony means that the India left. testimony of the above various surgeons-general in its totality is the testimony of the whole of Hindostan, a testimony gathered in most cases from a lifetime spent in the country, and finally a testimony totally opposed to what was declared by the Sanitary Commissioner with the Government of India in 1884 to be "experience of India" at the time.

(11) The Non-Spread by Water Argument.—In the Ninth Annual Report of the Sanitary Commissioner with the Government of India, the spread of cholera by means of water is declared to be a mistake. As an answer to this, I will now relate the history of cholera as it is shown by Dehra Doon, the last station at which I was located in India. Cholera appeared in Dehra Doon in 1887, 1890, 1892, and 1896. Dehra Doon lies at the foot of the Himalayas. Nearest the hill station of Mussooree are the lines of the 2nd Battalion, 2nd (P.W.O.) Goorkha Rifles; then comes those of the 1st Battalion; and, lastly, the regimental hospital. In 1887 the water supply for the regiment was taken

from the Tons stream, above the source of which are Mussooree and Jharipani, and the hill slopes below them. All the accumulated filth on these slopes is washed into the Tons on the occurrence of the first heavy downfall of rain. Numerous filthy villages are on the banks of the Tons, also many villages on the canal from which the water supply is taken off.

In 1887 cholera was present in the villages. The first heavy rainfall occurred on June 28th; on July 1st epidemic cholera broke out in both battalions severely

and almost simultaneously.

In 1890 a most excellent new water supply had been delivered to the 2nd Battalion, taken off from a copious natural spring. From the pucca reservoir it was led by pipes into the lines. There is no village above the source of the water. The water supply of the 1st Battalion, of No. 8 Mountain Battery, which had been added to the garrison, and to the hospital, remained as before. In 1890 cholera was again prevalent in the villages. The first heavy rainfall occurred on June 29th. Cholera broke out epidemically on July 2nd in the first Battalion, the Mountain Battery, and the hospital. No cases occurred in the 2nd Battalion lines.

In 1892 the new water supply had been extended to the 1st Battalion lines and the Mountain Battery, but not to the hospital. Cholera broke out at Hurdwar on March 9th, and after some of the pilgrims had returned from Dehra, there occurred a severe epidemic in the city and nearly all the villages in the Dehra Doon valley. This epidemic is said to have been the worst ever known in the Doon. There was now no epidemic in either the 1st or 2nd Battalions; but cases occurred in connection with the hospital, which had not yet the new water supply. There was also no epidemic in the Mountain Battery.

In 1896 cholera was again virulent in Dehra about July 12th. The new water supply was now extended to the hospital. There was no epidemic in either the

two battalions nor the hospital.

I have thus submitted this climatic theory to the fullest criticism, and it is found wanting. What else could be expected of a theory that was described by the late Professor Parkes, of Netley, as "revolutionary," and by his successor, Professor De Chaumont, as "Nihilistic"?

In conclusion, we have now seen how the Sanitary Commissioner with the Government of India for 1879 differed from the Sanitary Commissioner with the Government of India for 1867: on every point exactly opposite conclusions are drawn. Now it may be argued that the initial circumstances of place or of mode of dispersal of the pilgrims were different in 1867 and 1879, otherwise how can such diametrically opposite views of the two occurrences be explained? But this argument will not hold water, for the Sanitary Commissioner in 1879 expressly declared that the attendant circumstances were nearly exactly the same as in 1867. Such, then, being the case, it will be, to say the least, surprising to learn that the Sanitary Commissioner with the Government of India for 1867 is one and the same identical officer as the Sanitary Commissioner with the Government of India for 1879. Lastly, inasmuch as the views of the officer

for 1879 had changed from those he held in 1867, it might have been supposed that any one holding the more general view of Indian sanitarians would meet with a certain amount of tolerance. Indeed, in his brochure, "Cholera: what can the State do to prevent it?" the Sanitary Commissioner on p. 106 thus writes: "It has been asserted that medical officers in India have been discouraged and indeed prohibited from reporting facts which favour the contagion theory of cholera. A more groundless assertion was never made." But we have already related the Berar order. And in 1882, Surgeon-General Burnell, of Madras, an officer of thirty-six years' service, when as Sanitary Commissioner of Madras he transmitted his Annual Report to the Sanitary Commissioner with the Government of India, embracing convincing evidence of the propagation of the disease by the pilgrims dispersing from Tirupati, was severely animadverted on for such an expression of opinion. How can such a change of opinion be accounted for? The late Professor Maclean, the Professor of Military Medicine at Netley, on p. 231 of his work on the "Diseases of Tropical Climates," thus writes concerning this change of opinion: "It is impossible to resist the conclusion that, consciously or unconsciously, political considerations weighed with this able officer when he changed his opinion in this remarkable manner. It is certain that the Government of India were alarmed lest, if it could be established that cholera followed the great lines of human intercourse, foreign nations, in their jealousy of British commercial prosperity, should establish, to the detriment of Indian trade, quarantine regulations of an oppressive character. It is certain that Dr. Cuningham and some of the high officials of the Civil Government lost no opportunity in expressing in strong terms their opinion that to reason from facts before them, showing the influence of human intercourse or water on propagating cholera, was highly culpable, and a practice to be reprobated. Any other theory than the one advocated in the Annual Reports of the Sanitary Commissioner with the Government of India was wrong, and the officer who sinned in this way was branded as a mischievous theorist.'

With these plain words of my former distinguished teacher, whose eloquent lectures portrayed in stirring language the intricate nature of tropical disease, and whose generous and warm-hearted pen was always at the service of his brother officers, I conclude this account of the theory of cholera as it was formerly ordered in India by Surgeon-General J. M. Cuningham, C.S.I., Sanitary Commissioner with the Government of India.

PLAGUE.
PREVALENCE OF THE DISEASE.

India.—During the two weeks ending February 8th and 15th, the deaths from plague throughout all India numbered 15,165 and 12,675 respectively.

Plague in the Bombay Presidency during February, 1902.—Bombay City, reported plague cases 3,245, deaths 2,561. Bombay Districts:—Panch Mahals, 13 cases, 10 deaths; Kaira, 1,747 cases, 1,088 deaths;

Broach, 809 cases, 607 deaths; Surat, 385 cases, 286 deaths; Thana, 198 cases, 161 deaths; Khandesh, 3,094 cases, 2,324 deaths; Nasik, 287 cases, 231 deaths; Poona, 692 cases, 514 deaths; Satara, 4,846 cases, 3,397 deaths; Sholapur, 1,026 cases, 775 deaths; Abmednagar, 7 cases, 5 deaths; Kolaba, 121 cases, 101 deaths; Ratnagiri, 69 cases, 51 deaths; Belgaum, 3,125 cases, 2,428 deaths; Dharwar, 3,582 cases, 2,610 deaths; Bijapur, 12 cases, 7 deaths; Kanara, 28 cases, 19 deaths. States:—Hyderabad, 169 cases, 121 deaths; Shikarpur, 5 cases, 2 deaths; Kathiawar, 96 cases, 68 deaths; Cutch, 208 cases, 182 deaths; Rewa Kantha, 231 cases, 158 deaths; Kolhapur, 2,519 cases, 1,632 deaths; Jamjira, 155 cases, 112 deaths; Aundh, 76 cases, 43 deaths; Savanur, 127 cases, 105 deaths; Sachin, 57 cases, 51 deaths; Baroda, 830 cases, 545 deaths. Poona City, 495 cases, 474 deaths; Karachi City, 221 cases, 193 deaths. Europeans, 3 cases, 4 deaths.

EGYPT.—The Director-General, Sanitary Department, reports that in Egypt during the two weeks ending February 16th and 23rd, the number of plague cases were 8 in each week, and that the deaths from the disease were 8 and 5 respectively. The disease prevailed chiefly at Tantah, but isolated cases were reported from Abusir, Mit Ghamr and the neighbouring village of Kom-el-Nur, Alexandria, Mehallet-Abu-Ali, and Zifteh. Since the commencement of the present outbreak to March 8th, 329 fresh cases of plague have been reported in Egypt and 196 deaths from the disease.

CAPE OF GOOD HOPE.—On February 1st, 7 cases of plague remained in hospital in different parts of Cape Colony. At that date plague appeared to be dying out, as but one case of plague (Mossel Bay) was reported at the Cape during the week ending February 1st. There were no deaths from the disease during the week. During the week ending February 8th there was again no fresh case of plague reported, and but one death from the disease—a coloured male—at Mossel Bay. On February 8th four persons, namely, three European males and one male native, remained under treatment in hospitals at Port Elizabeth (1), Cape Peninsula (1), and Mossel Bay (2). The total cases to February 8th in the Cape of Good Hope amounted to 876, of which 638 were males and 238 females; of this number 221 were Europeans. the total number attacked 421, or 48.1 per cent., died. The death-rate amongst Europeans attacked amounted to 33.9 per cent.; amongst coloured persons to 56.7 per cent.; and amongst natives to 44.4 per cent.

MAURITIUS.—During the two weeks ending February 27th and March 6th, the number of fresh cases of plague in Mauritius amounted to 7 and 19 respectively, and the deaths from the disease during the same periods to 3 and 5.

SYDNEY.—Plague has recurred in Sydney, and up to March 4th, 46 cases had occurred, and 14 deaths from the disease.

ACTION OF ANTI-PERIODIC DRUGS ON THE PARASITE OF MALARIA.—Lo Monaco and Panichi announce that a drop of a solution of quinine added to a fresh speci-

men of malarial blood, affects the parasites in proportion to its concentration. A weak solution causes them to contract for a few minutes and then expand with marked pseudopodia. This condition of excitement is still more pronounced if a drop of a medium solution of quinine is added to the specimen, and it terminates in the escape of the parasite from the blood corpuscle. A still stronger solution permanently shrivels the parasite and it does not leave the corpuscle. They, therefore, administer quinine in malaria in the dose and solution equivalent to that which produces the detachment of the parasite from the corpuscle in vitro—the second phase of the action of quinine. They state that the smallest forms of the parasite are the most resistant to quinine, and that all the parasites grow more resistant the longer the interval since the febrile attack. They conclude from the latter fact that there must be some substance in the blood at the time of the attack which has an antiparasitic action, and the effect of quinine administered at this time is reinforced by this substance already in the blood. This antiparasitic substance affects all the forms of malaria and all species of the malarial parasite with the sole exception of the young unpigmented variety found in æstival tertian. The pigmented forms, on the other hand, are resistant to the action of quinine during apyrexia, but become less resistant during a febrile attack and can then be detached from the red corpuscles with a comparatively weak solution of quinine. But when the malaria has assumed the pernicious form, both the pigmented and the non-pigmented forms display great resistance, probably owing to the absence of the antiparasitic substance in the blood under these conditions, or the presence of some yet unknown antagonistic substance. The quinine behaves the same whether in a solution of distilled water or in a 38 per cent. saline solution. A stronger saline solution prevents these phenomena.—Riforma Medica Rome, January 2nd, 3rd, 4th, and 7th, from Journ. A. M. Assoc.

## CIRCULAR ON THE PREVENTION OF PLAGUE.

(Circular issued in Glasgow, Liverpool, Bristol, &c., modified to suit local requirements.)

THE DESTRUCTION OF RATS.

To Owners and Occupiers, Warehousemen, and Others.

Whereas it is expedient that rats in every English city should be destroyed, the Health Committee invite the careful attention of owners and occupiers, warehousemen, and others, to the following memorandum, and their co-operation in the measures suggested, which, for the greatest safety, would be best carried out before any actual invasion occurs. Participation in this work should be accepted by every citizen as part of his municipal duty at the present time.

In the event of the introduction of plague into the city, its extension would be best met:—

(1) By wholesale destruction of rats.

(2) By their exclusion from dwellings, warehouses, and places of business generally, and by the destruc-

tion of their haunts and feeding-places in the vicinity of dwellings.

To be effective, the effort must be general, and strict watch should be kept for the appearance of rats in places not at present infested by them.

Rats gain access to buildings chiefly:

(1) By burrowing through the earth below wooden flooring.

(2) Along the course of drainage and other pipes led through main walls in holes which are too large, and up the course of rain water pipes.

(3) By the badly-fitting doors, doors broken at the foot, and other openings on ground-floors.

This is to be met :-

(1) By cementing or asphalting earthen basements when these are burrowed.

(2) By packing loosely-fitting holes through which

drain or other pipes pass.

(3) By refitting doorways, protecting the foot if necessary with sheet-iron, and by protecting openings in basements by wire netting if nothing better can be done.

Rat runs in buildings should be discovered and

destroyed.

It is useless to stop rat-holes in a house and leave the means of access to the tenement still open. Rats overrun a building behind the plaster and woodwork, in the casing of pipes, and below flooring, but they gain access at the basement.

Rat-infested premises may be dangerous to the health of the tenants and a menace to the neighbours, and may thus be dealt with under the Public Health

Landlords are requested at once to inquire into the presence of rats on their properties, and to take action on the above or on similar lines.

Rats are attracted to buildings in search of food.

Ashpits, collections of garbage, stable yards, &c., afford them food; lumber-heaps, or disused structures, are suitable for nesting.

Owners are reminded that ashpits that are allowed to be a nuisance may be dealt with under the Public

Health Acts.

Slaughtermen and others are warned that contraventions of, and neglect to observe, the bye-laws with regard to the removal of garbage are punishable.

All household refuse should, as far as possible, be

burned by the householder.

The Health Committee rely on the willing cooperation of landlords and householders in these directions, and tenants will forward the work of repression by informing them of premises which are rat-infested.

To DESTROY RATS.

Trapping and poisoning are the most readily available methods; hunting with dogs, ferrets, or a mongoose is sometimes practicable, but they can rarely follow the rat into its burrow.

Trapping.—The most useful form of trap is a spring trap, baited with ham. Cage traps are too large, and the rat soon learns to avoid them.

Poisoning.—Some form of arsenic or phosphorus paste is to be preferred. There is no available poison which will preserve the dead rat from putrefaction and prevent smell.

#### EXCHANGES.

Annali di Medicina Navale.

Archiv für Schiffs u. Tropen Hygiene.

Archives de Medicine Navale.

Archives Russes de Pathologie, de Médec. Clinique et de

Bacteriologie.

Australasian Medical Gazette.

Boletin de Medicina Naval. Boston Medical and Surgical Journal.

Bristol Medico-Chirurgical Journal.

British and Colonial Druggist. British Journal of Dermatology.

British Medical Journal.

Brooklyn Medical Journal.

Caducée.

Climate.

Clinical Journal.

Clinical Review.

Giornale Medico del R. Esercito

Hong Kong Telegraph.

Il Policlinico.

Indian Engineering.

Indian Medical Gazette.

Indian Medical Record.

Journal of Balneology and Climatology.

Journal of Laryngology and Otology.

Journal of the American Medical Association.

La Grèce Médicale.

Lancet.

Liverpool Medico-Chirurgical Journal.

Medical Brief.

Medical Missionary Journal.

Medical Record.

Medical Review.

Merck's Archives.

New York Medical Journal.

New York Post-Graduate.

Pacific Medical Journal.

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3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

## The Journal of Tropical Medicine.

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### Original Communications.

### PRINCIPLES DETERMINING THE GEO-GRAPHICAL DISTRIBUTION OF DISEASE.

By Louis W. Sambon, M.D.(Naples).

Lecturer to the London School of Tropical Medicine.

(Continued from p. 95.)

WHILE each parasite has its special limit of host species, each species of plant or animal has its particular parasitic flora and fauna. If we take the black poplar as an example, and count all the plants and animals which live upon it, within it, or in association with it, we shall find that they number not less than fifty. Its roots are covered by the mycelia of a fungus, and pierced by the suckers of toothwort plants. The toothwort withdraws the juices absorbed by the roots through the instrumentality of the symbiotic fungus. Meanwhile, in the cavities in the leaves of the toothwort, various small animals are caught and made use of as nitrogenous food. Again, the poplar tree bears mistletoe on its boughs, and its presence is due to the missel-thrush. The thrush takes the mistletoe berries for food, and in return, renders the plant the service of dispersing the seeds and establishing them on other trees. The parasitic mistletoe takes its liquid nutriment from the wood of the poplar tree; but, on the other hand, its own stems are covered with lichens and these lichens are themselves a symbiotic community of algæ and fungi. Within the wood of the poplar stem spread the mycelia of certain basidiomycetes (Panus conchatus and Polyporus populinus), whilst the leaves are covered with a little orange-coloured fungus, Melampsora populina. In addition, no less than three gall-creating species of pemphigus live on the leaves and branches of the poplar, and a number of beetles and butterflies are nourished by them. Certain lichens, mosses, and liverworts regularly settle on the bark of

old trunks, and included amongst these may be the species of liverwort which is inhabited by rotifers.

In some cases (Monogenea) the complete evolution of a parasite only requires one host, in other cases (Digenea) it demands two, successive and, in general, specifically different hosts. Thus, whilst Hymenolepis murina goes through its entire life-cycle without any change of host, Taenia saginata spends its larval stage within the tissues of herbivorous mammals, and its adult stage within the intestine of certain carnivora. The two necessary hosts may belong to widely-sundered groups of the animal kingdom. Dipilidium caninum spends its adult stage in a mammal (cat or dog) and its larval stage in an insect (Thichodectes canis or Pulex serraticeps).

The distribution of parasites requiring two hosts, belonging to two different groups is, of course, limited to those areas in which both hosts are simultaneously found. However, the geographical distribution of heterogeneous parasites is often very complex, because, although only two hosts are necessary for the complete evolution of their life-cycle, one or both hosts may be represented by a number of species.

The adult Fasciola hepatica, which causes the disease called "liver rot" in sheep, is found in a large number (about twenty-five) of domesticated and wild animals, and its rediæ develop in several species of fresh-water snails (Limnæa). Thus, the number and sub-cosmopolitanism of both its definite and intermediate hosts fully explain the wide geographical distribution of this trematode.

The definitive host of our malarial parasites is represented by several species of Anopheles, but the geographical distribution of the intermittent fevers does not coincide exactly with the geographical range of these insects. Anopheles maculipennis is found in several parts of Italy in which malaria is unknown, and it is still quite plentiful in England in all those places in which ague was once very prevalent. So far, no other animals have been found to foster the endogenous cycle of our malarial parasites; but such

a possibility is not altogether excluded, and the three species of hæmocytozoa, found by Dionisi in bats, are strikingly like our own parasites. It is not absolutely unreasonable to surmise that the disappearance of ague in England may be connected with the extinction of some animal, or possibly some plant, which may have been a necessary link in the chain of its natural history. As an example of a species which has lately become extinct within the ague districts of England, I may mention the Large Copper Butterfly, which was formerly found in abundance in the Cambridgeshire fens and nowhere else in the world.

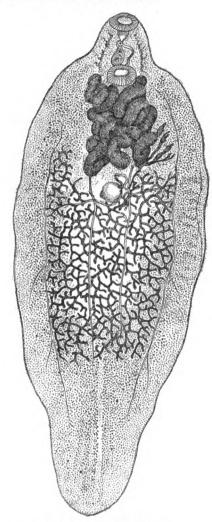


Fig. 13.—Fasciola hepatica.

Even after the establishment of the parasitic theory in the causation of disease, it would have been difficult to account for the geographical distribution of diseases so long as plants and animals were believed to have originated in the areas they now occupy, or climate was considered to be the principal factor in their distribution. Now, we know that the geographical distribution of plants and animals is due to the co-operation of many factors, and that any solution which does not recognise all the factors is bound to be erroneous.

The most important conditions determining the distribution of species are not the meteorological conditions, as was formerly believed, but association and



Fig. 14.—Limnæa truncatula.

competition with other plants and other animals. When the purely physical conditions were considered paramount, it was difficult to explain why one region should differ so greatly in its floral and faunal aspects from another whose physical characteristics were practically identical with its own, or why certain plant and animal assemblages should enjoy an almost limitless or universal extension, while others, without apparent reason, should be circumscribed within very narrow limits.

To explain the influence of the animate environment in determining distribution, I may mention that red clover would not grow in New Zealand until bumble-bees were introduced to fertilise its flowers. Now, it displaces the native grasses. Darwin points out that cats are also in a measure responsible for the productions of clover seed in England, through the interrelations of cats, field-mice and bumble-bees.

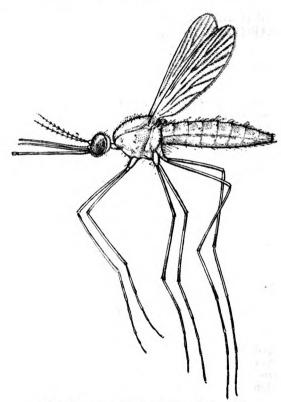


Fig. 15.—Anopheles maculipennis (female).

Numerous flowering plants, such as arbutæ, ericaceæ, and rhododendrons, cannot thrive unless the soil contains certain fungi, with which they are invariably associated. The fungus covers their roots with a felt-like mantle of hyphæ which assume the function of root-hairs, and supply the green-leaved

plant with nutrient materials from the ground, while the green-leaved plant supplies the mycelium with substances elaborated above in the sunlight. This association, called mycorrhiza, probably originated as a form of parasitism, but has become a true symbiosis similar to that of a lichen thallus. A similar association is that of certain bacteria with many legume plants, such as peas and beans. The bacteria live on the roots in little wart-like outgrowths, called "root-tubercles," and supply the host-plant with nitrogen absorbed from the air circulating in the soil.

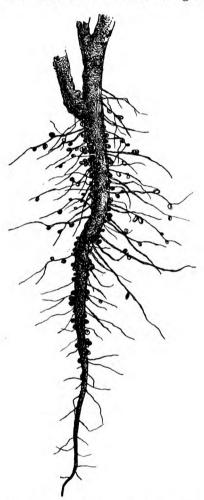


Fig. 16.—Root-tubercles on Vicia faba.

The conditions which determine the abundance of a species and the extent of its range are often greatly complicated. Conditions are dependent upon conditions in an almost endless chain. Howard has recently proved the existence of several fatal tertiary parasites and the probable existence of quaternary parasites with Orgyia leucostigma in Washington. Upon the condition of this chain of interdependencies rests the welfare of the primary host. If adverse conditions affect the quaternary parasite, the primary host suffers, for the tertiary parasites increase and kill off the secondary parasites, allowing an increase of the primary parasites which kill off the Orgyia.

In studying the geographical distribution of diseases, apart from any preconception as to their causation, we find that its salient facts are identical with those

of zoo-geography.

Some diseases, like typhoid fever, tuberculosis, pneumonia, and dysentery, have a very wide distribution; others, like endemic hæmaturia and dracontiasis, are encompassed within narrow limits; others, again, like cholera and plague, while usually occupying a restricted habitat, may, at times, under favourable conditions, spread very widely. This is exactly what we find in the distribution of animals. Some, like the small serotine bat (Vespurgo serotinus), the fish-hawk (Pandion haliaëtus), and the common red river-worm (Tubifex rivulorum), have a world-wide range; others have a very restricted habitat. Several species of humming-birds are restricted respectively to the volcanic peaks of Chimborazo and Pichincha in the equatorial Andes, and to the extinct crater of Chirigui, in the province of Panama, Columbia. Certain fishes are limited to a single lake: thus the Lough Killin charr is confined to the lake of that name. Examples of animals which may occasionally spread out of their usual habitat are the Norwegian lemming and the migrating locust. Too much stress should not, however, be laid upon what would appear to be the absolute localisation of a species, since such supposed localisation is frequently only the expression of defective knowledge. The famous South American oil-bird (Steatorius caripensis), for example, was for a long time believed to inhabit solely a cave near Caripé, in the province of Cumana, Venezuela. Now we know that it has a comparatively broad area of distribution which embraces Sarayacu and Caxamarca in Peru, Antioquia in Columbia, and the Island of Schistosoma hæmatobium, the parasite which causes endemic hæmaturia, was believed to be restricted to the African continent; more recent research has proved it to have a wider distribution in the adjacent islands, on the Arabian coast of the Red Sea, and in Mesopotamia. Verruga seems to be confined to certain valleys of the Peruvian Andes; but, if like coko, parangi, and purru, it is nothing more nor less than yaws, then, of course, it has a very wide geographical distribution.

The usual method of indicating on maps the distribution of diseases is by colouring the whole area of their geographical range. But although perhaps this may be the only possible method on very small maps, it is greatly misleading, because, even when the distributional area of a disease is continuous, its stations rarely form one continuous tract. A suitable illustration is that of the intermittent fevers. Their distribution is very wide, but each type of fever has its own peculiar distribution, and in the various regions of its habitat it is only found in certain stations where the suitable circumstances occur; usually low, swampy districts, infested by Anopheles. To map out correctly the distribution of these fevers, a different colour should be adopted for each fever, and their various stations should be marked by dots, which would thus permit the overlapping of the various fevers in proportion to their prevalence. The map would thus be coloured by series of closely-set but separate variegated patches. In disease distribution

as in zoo-geography we must distinguish between locality and station. Animals inhabiting forests or moorland, or pools, are only found where such physical conditions occur.

The geographical distribution of disease is subject to variation. Indeed, it is just as unstable as that of animals and plants. Some diseases become extinct, or their prevalence diminishes, and thus endemic areas become restricted; others shift their habitat, spread more widely, become more prevalent, and invade new countries. Leprosy has become almost extinct in Europe; on the other hand, small-pox, scarlet fever, whooping-cough, and the chige-pest have spread continuously, invading new countries.

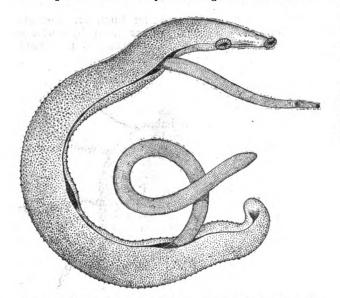


Fig. 17.—Schistosoma hæmatobium. (Female enclosed in gynecophoric canal of male.)

The intermittent fevers are a good example of the changes and fluctuations in the distribution and prevalence of certain diseases. These fevers have entirely disappeared from England, where, at one time, they used to be very prevalent; they have invaded new places, such as the Islands of Mauritius and Réunion, where they were previously unknown, and, in Southern Italy, they receded before the practical sanitation of the old Greek colonists, to return once more, like a tide, as soon as the land fell out of cultivation.

These variations are similar to those which take place in the distribution of animals and plants. The bear, the wolf, the wild boar, the beaver, have become extinct in England; the lion has disappeared from Greece; whales have been restricted to the Polar regions. On the other hand, the brown rat, the rabbit, the sparrow, the Ligurian bee, the thistle, have spread very widely.

Some diseases, when first imported into a new country, have at once spread like wildfire; others, although repeatedly imported, have never become endemic in the new locality; others, again, have become acclimatised in some places and not in others.

The chiga, which formerly was confined to Central America and the West Indies, was carried in ballast in 1872 on a vessel from Rio Janeiro to the coast of Guinea. Thence it spread over the greater part of Africa with incredible rapidity. On the other hand, Filaria loa, though frequently introduced by Negro slaves into the West Indies, has never become acclimatised in those islands. All these peculiarities in the geographical distribution of disease, which could not possibly be explained by any of the old theories, find at once a satisfactory explanation in the parasitic theory. The capacity of a species for transportation and acclimatisation in a new environment depends upon the degree of simplicity of its ecological conditions. These conditions are still very imperfectly known. Thus, taking an example from the Diptera, we do not know why Calliphora erythrocephala, Cyrtoneura stabulans and Stomoxys calcitrans should have been introduced at an early date and flourished to excess in America and many other countries, while Sarcophaga carnaria is unknown in any of them.

Very many species are constantly being introduced, yet, failing certain conditions, such as an appropriate season at the time of importation, they may not establish themselves for centuries in places which seem to offer the most suitable environmental conditions.

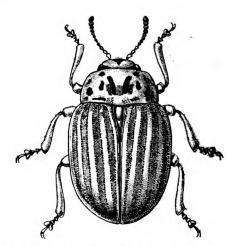


Fig. 18.—Potato-beetle (Chrysomela decemlineata).

An interesting example with regard to the distribution and prevalence of disease is that of the rôle played by Solanum rostratum in connection with the ravages of the potato-beetle (Chrysomela decemlineata). Solanum rostratum is an undesirable weed or thistle, on account of its prickles. It is a subglobose plant, and has the tumble-weed habit, i.e., when ripe, it snaps off close to the ground and goes bowling along before the wind at a great rate; but it may also travel by means of animals, its prickly seed-pods becoming entangled on the tails of cattle. It was noticed in various parts of America where the Colorado beetle had spread that its ravages diminished with the advent of Solanum rostratum, and augmented whenever this weed was eradicated. The cause is that Solanum rostratum is the native food-plant of this beetle, and that only when it is scarce the nearly related potato-plant (Solanum tuberosum) is accepted as a substitute.

The part played by plants and animals in the propagation of disease-parasites is becoming more evident every day. In 1877, Dr. Manson proved that mosquitoes were the propagators of filarial diseases, because he discovered that Culex pipiens was the intermediary hosts of Filaria bancrofti. In 1898, Ross proved that certain mosquitoes of the genus Anopheles were the definite hosts and disseminators of malarial parasites. It has long been known that flies can carry about the pathogenic parasites of plants and animals, just as they carry the fertilising pollen of flowers on the hairs of their claws, and now the rôle of Musca domestica in the propagation of anthrax, cholera, ophthalmia, and typhoid fever is fully recognised. The association of Trichina spiralis with hogs and rats; of Bacillus pestis with rats,

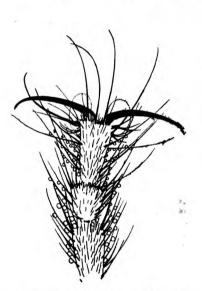


Fig. 19.—Foot of house-fly, with spores of various parasitic fungi.



Fig. 20.—Wing of grass-fly, with spores or conidia of the potato fungus (Peronospera infestans).

marmots and fleas; of Tania echinococcus with sheep and dogs; of Dyplidium caninum with Pulex serraticeps and Tricodectes canis; and of Nagana disease (Trypanosoma brucii) with the tzetze fly (Glossina morsitans), are well-known examples.

A very interesting association is that of the cattle-tick Ripicephalus annulatus, with Texas fever. This tick does not carry the disease in a direct manner from a diseased animal to a healthy one, because it does not usually change host as was at one time believed, but the female tick transmits the protozoal parasite (Piroplasma bigeminum) of Texas fever to its progeny, through the egg, and the young larvæ carry it to the cattle on which they in turn become attached, and probably only the female ticks inoculate it when, at maturity, they imbibe blood.

No doubt we derive the largest proportion of our

No doubt we derive the largest proportion of our disease from those animals with which we come into daily contact, such as cattle, house pets, city insects and household pests, and above all from those which are used as food.

The cause of epidemics seemed at one time an inserutable mystery. The physicians of some decades ago spoke of a genus epidemicus, and Noah Webster, the great lexicographer, who was a physician, strove to establish a connection as cause and effect between earthquakes, hurricanes, volcanic eruptions and the outbreak of great epidemics. Now, in the light of the parasitic theory, the cause of epidemics is quite obvious. Disease epidemics occur exactly in the same way, and for the same reasons, as animal pests, that is to say, they are due to an excessive increase of the pathogenic agent under very favourable conditions. Field voles in "vole years" appear in our fields in enormous numbers, and literally honeycomb the soil. Unable to explain their prodigious increase, the ancients believed that they occasionally rained down from the clouds. During damp autumns and late summers, field-snails appear as if by magic in wondrous numbers, and may bring about serious epizootics of tape-worms amongst fowls.



Fig. 21.—Ripicephalus annulatus (female).

Any species whatsoever, if not restrained by adverse conditions, would soon increase to such an extent as to fill the whole world with its progeny. Crampe has clearly proved that the fabulous multiplication of field-voles, under favourable conditions, finds its explanation in the great fertility of the females, in the appearance of several successive generations in the same year, and in the numerical preponderance of the females over the males.

The fertility of some species is really wondrous. A queen bee lays about five million eggs in her lifetime of four or five years. A female white ant produces eighty thousand eggs a day steadily for several months.

The greater the danger to which an animal is exposed as a result of structure, mode of life, or development, the greater are its powers of increase. Animal parasites which pass from one host to another, or which spend a part of their existence in a free state, run such a risk of not finding a suitable host, that they are necessarily endowed with enormous powers

of multiplication. But, however great the increase of certain species, the crowd of life is such that there is little danger of one species flourishing to the exclusion of all others.

Although the appearance of most pests is due to local increase, some may be due to migration. The Scandinavian lemming and the devastating locust are well-known examples of animals which migrate occasionally on account of unchecked multiplication and scarcity of food in the region which they inhabit.

The migrations of the lemming occur at intervals varying from five to twenty years. These little arctic mammals move as an army, steadily and slowly, advancing always in the same direction and regardless of all obstacles, swimming across streams, and even lakes of several miles breadth. The migration lasts from one to three years, and usually ends in the total

destruction of the migrating swarms.

The migrations of the Rocky Mountain locust (Caloptenus spiritus), have been thoroughly investigated by the United States Entomological Commission. The history of the American locust is in nearly all respects parallel with that of the locust of the old world. Both insects have a permanent breeding area, and both, periodically, under special favouring conditions, multiply in enormous numbers, and migrate far

beyond their usual habitats.

The permanent breeding region of the Rocky Mountain locust is approximately 300,000 square miles, and lies mainly between longitude 102° and 114° west of Greenwich and latitude 63° and 40° north. The locust does not breed continuously over the whole extent of this area each year; but while for a series of years it may deposit its eggs in a given river valley, in some park, or in some favourable area on the plains lying about the mountains, in a certain year or for several years in succession, it may desert its customary breeding grounds for adjoining regions, or cross a low range of mountains and breed in a more distant valley. Moreover, the true breeding grounds in this area are for the most part confined to the river bottoms, or sunny slopes of uplands, or the subalpine grassy areas amongst the mountains, rather than continuously over the more elevated, dry, bleak In vertical distribution it may be said to breed from an altitude of about 2,000 feet up as far as 10,000 feet, or near the timber line in the Rocky Mountains, though few probably breed in great numbers above an altitude of 8,000 feet.

When the locust multiplies in great numbers it is liable to spread out of its permanent breeding ground, and invade a wider area which extends over the elevated plains east of the Rocky Mountains and includes a large portion of British America. This region is known as the subpermanent region, but there are no natural barriers between the permanent and subpermanent regions, one region shading imper-

ceptibly into the other.

In certain years the multiplication is excessive, and then the migrating swarms push further east into what has been called the temporary region. limit of this region is the Mississipi, which, as Mr. Walsh first pointed out, the locust never crosses.

The bearing of these facts on the study of epidemics is quite apparent.

Many of our most formidable diseases have been imported, like noxious weeds and injurious insects, from one country to another through the agency of man. The opening up of the vast tropical belt, the wondrous growth of international trade, the greater rapidity of transit, and the safer carriage of goods of all kinds, have enormously increased the opportunities of accidental introduction of foreign diseases. There are several diseases potentially cosmopolitan which threaten to invade new countries, amongst such are beri-beri, blackwater fever, yaws, and sleeping-A restricted habitat is no evidence of sickness. inability to spread. The Coccida under natural condition, have usually a rather restricted distribution, but by means of commercial distribution of nursery stock many of them have become of almost world-wide range. Fortunately their enclosed hymenopterous parasites have spread almost equally with their hosts. must therefore prepare to prevent the spread of exotic diseases by appropriate legislative measures, such as those adopted by New Zealand, Australia, Cape Colony, and the various American States to protect themselves from the introduction of insect pests and dangerous weeds. But to be able to lay down exact prophylactic rules, we must be fully acquainted with the life-history, ecology and present geographical distribution of the pathogenic agents we wish to avoid.

In the domain of agriculture man has already achieved wondrous success. The locust plagues of North America have been almost stamped out, and Riley saved the orange orchard of California by pitting the Coccinellidæ against the Coccidæ. Similar results can most certainly be obtained in human pathology, and, indeed, recent experiments on the prophylaxis of malaria and yellow fever have proved most successful. Last year, the Sanitary Department of the U.S. army succeeded in eradicating yellow fever from Havana where it had been constant for the last 150 years, simply by putting into act and fact the recently acquirde knowledge that the Stegomyia mosquito is the carrier of yellow fever and that this fatal disease is not transmitted in any other way.

#### NOTE ON THE SPREAD OF YELLOW FEVER.

By C. CHRISTY, M.B., C.M.Edin. Thompson Yates Laboratory, University College, Liverpool.

In reading through a series of most interesting papers published in the British Medical Journal during the years 1841-42, by E. J. Burton, M.D., on the diseases he met with during his term of service at Sierra Leone, I find a footnote (p. 309) of peculiar interest at the present date in the light of recent revelations in the etiology of yellow fever and for other reasons. Dr. Burton writes:-

"It being at present [that is, 1842] almost generally supposed that yellow fever is neither contagious nor propagated by infection, I wish particularly to mention the grounds on which it is stated that this disease was introduced and propagated by contagion amongst the inhabitants of the Island of St. Mary's, in the year

1837. The crew of Her Majesty's brig "Curlew," I think, but I cannot be quite positive as to the name, contracted the yellow fever at Sierra Leone in 1837, where it was then raging. She sailed from that place for change of air, and entered the port of St. Mary's, having at the time some of her officers and crew labouring under the disease. At the period of her arrival St. Mary's was quite healthy and free from fever of any kind. Some of the officers afflicted with yellow fever were landed and brought to the house of the Colonial Surgeon, Mr. Tebbs, who attended them; he was, in a few days, seized with the disease and died, although a 'seasoned person.' The fever now spread rapidly, the first cases all being traced to have had communication with Mr. Tebbs or his patients. That this fever was imported into St. Mary's, and then propagated by contagion, is strongly supported by the fact that the disease commenced in this place, previously healthy, immediately after the arrival of the vessel having the fever on board, and that it never had before appeared in that settlement, nor has it ever appeared since. It is not wished to maintain that yellow fever is always contagious, or always propagated by the same cause, but the fact of its having been imported and propagated in this instance by contagion is given as a simple fact, and not for the purpose of supporting any particular theory or argument.'

Burton apparently had very good grounds for believing this to be a clear case of contagion, but reading between the lines, we now realise that it was a very pretty example of indirect infection. The Island of St. Mary is off the north-west coast of Sierra

Leone.

#### WATER ITCH, OR SORE FEET OF COOLIES.

By WILLIAM E. LLOYD ELLIOTT, M.D.

Late Medical Officer of the Assam Frontier Tea Co., Dibrugarh, Assam.

In a paper by Dr. Dalgetty (Sylhet), in the Journal of Tropical Medicine on March 1st, 1901, on water itch, he comes to the conclusion that the disease is caused by an acarus, of which he gives a minute and interesting description. In this article Dr. Dalgetty alludes to an article published by me in the Journal of Tropical Medicine, December 15th, 1900.

I think, however, that Dr. Dalgetty's conclusions and methods of investigation are open to various

objections.

The presence under the microscope of "the chief organisms of putrefaction," "rapidly moving diplobacilli," "fæcal matters," "pus cells," "particles of sand," "fibres of cloth and other extraneous matters," shows that he must have examined the vesicles in the pustular stage, and in many cases after they had been contaminated by rupture, as all these things could hardly have passed through the unbroken skin. I think the method should be to examine in the early vesicular stage before contamination can possibly have taken place, or, as suggested by Dr. Bentley (British Medical Journal, January 25th, 1902), by removing portions of the skin with vesicles intact, and making sections with a microtome.

The presence of the acarus in the crusts found on sores, or in crusts, &c., exposed to the air on a slide for several days, is surely no proof of the acarus having caused the disease, the crusts having been in both cases open to infection from outside sources.

I do not agree with Dr. Dalgetty that the disease "spreads" in any true sense, as it would if the acarus extended its burrow, for I have never known it to do so. The vesicles may come in successive crops, but the new ones are discrete. The only variety (the Herpetiform) which looks at all like an extended burrow, takes that form from the first, and is not formed from the centre outwards.

NOTE.—My original article was inserted anonymously owing to a misunderstanding.—W. E. (see page 112 of this issue).

"SURRA," OR EQUINE RELAPSING FEVER .- The presence of this disease in the Philippines was discovered October 16th, 1901, by Captain Allen Smith, Assistant Surgeon, U.S. Army, Surgeon in charge of the Army Pathological Laboratory, and Dr. J. J. Kinyoun, surgeon Marine Hospital Service. Smith and Kinyoun, examining the blood of a sick horse, found an actively motile body which, on investigation, proved to be apparently identical with the parasite found by Evans in India and Burma in 1881 in the blood of horses, mules and camels ill with what the natives called "surra," which means "rotten." This parasite, the trypanosoma Evansi, occurs in enormous numbers in the blood of animals ill with the disease. This disease has never been recognised, to our knowledge, before in the Philippine Islands. Large numbers of American horses and mules, as well as native ponies, have died during the past six months. In some provinces there are Pueblos without a single pony. In the main corral here in Manila some 200 and more horses and mules have died from a "wasting" disease during the past four months. This disease was generally diagnosed "glanders," and hundreds of animals were killed, until General Chaffee stopped it by a general order. Investigation has progressed to such a point that it is possible to state positively that this fatal epidemic among horses, mules and ponies is not glanders but "surra." The blood of nearly a hundred horses and mules, most of whom were diagnosed as having glanders, was examined. But little glanders was found in the Manila corrals; four-fifths of the deaths among Government horses and mules during the past three months have been from "surra." How the disease is disseminated is not known, but it has been induced in healthy animals—horse and monkey by the subcutaneous injections of the blood of a horse ill with surra whose blood contained the trypanosoma. Treatment seems of little avail; quinine and methylene blue do not seem to affect the course of the disease. Work is now being done especially in the direction of the mode of transmission. The evidence points to transmission by some sucking insect .-Boston Medical and Surgical Journal, January 30th,

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#### THE

## Journal of Tropical Medicine

APRIL 1, 1902.

# SMALL-POX AND ITS PROPHYLAXIS IN ORIENTAL COUNTRIES.

THE subjects of small-pox, vaccination and revaccination are being widely discussed in London and in several of the large cities of Great Britain at the present time.

We think a great deal of information could be given by medical men in the tropics on the subject of small-pox and its prevention, could they be induced to come forward and state their experiences, and the conclusions gathered from their experiences. One observer, Hem Chandra Sen, M.D., Calcutta, of the Campbell Medical School and Hospital at Sealdah, India, ventured, in the *Indian Medical Record* of February 19th, 1902, to formulate a statement upon "Recent vaccination as a preventive measure against both small-pox and plague." In his article he states: "Recent vaccination [for small-pox], as far as my

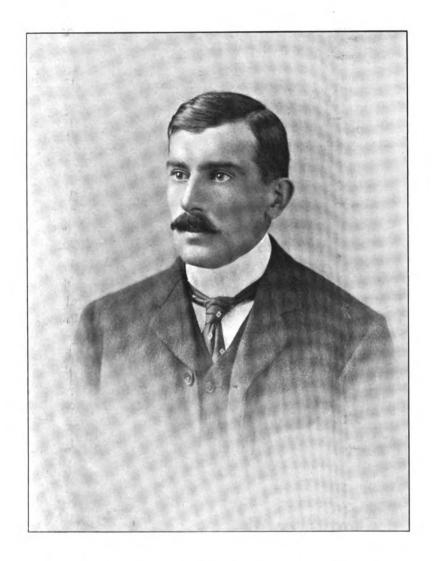
observations are concerned, prevents people from having an attack of plague in a vast majority of cases." Dr. Sen assigns the reason for this immunity from plague in vaccinated people to be due to the fact "that if any disease germ is introduced into the system, the vital force adds to the blood antitoxin to neutralise the introduced poison." He ascribes the protection to be due to increased activity of the phagocytes, and aptly illustrates this activity thus: "When the armed militia, or phagocytes, which guard the living human frame are stimulated with a mild virus like vaccine lymph to be on their guard, no stronger poison can do harm so long as they are properly on the alert."

Concerning the credit thus claimed for vaccination as a protection against plague as well as small-pox it is not our intention to discuss, but Dr. Sen's remarks may elicit opinions from others who are in a position to judge upon this matter.

It is a mistake to think that protection against small-pox is a new subject to the Oriental native. Prophylaxis by inoculation was known and practised in India, in China, and in other countries, before European ways and customs entered into the daily life of the inhabitants of these regions. In fact, it is more than probable that the west learned inoculation from the east.

The Chinese acquired immunity by inoculating in one of three ways. The infected person's clothes were worn by the healthy; or the contents of small-pox pustules were applied to a scratch in the skin, just as we vaccinate at the present day; or a dry small-pox scab was reduced to powder and blown up the nostril.

Vaccination with lymph was not known in China until the year 1801, when vaccine matter was introduced by traders belonging to the old East India Company. In the Philippines vaccination was introduced by the Spaniards about the same date. The difficulties of introducing vaccine from Europe to the Far East in the early days of the nineteenth century, when sailing ships were then the only means of transmission, were such that some intermediate form of lymph production had to be established. The British attained their purpose from India; and the Spaniards, by travel-



THE LATE PATRICK THURBURN MANSON, M.B.Lond.

Who died March, 1902, at Christmas Island, whilst engaged in the scientific investigation of Beri-Beri.



ling across South America and renewing their lymph source on the way, ultimately reached the Philippines across the Pacific.

But vaccination has attained but little hold on any Asiatic people, and revaccination may be said to be, except under compulsion, unknown and The adult natives, and especially unpractised. those who have been vaccinated in their infancy, resent being vaccinated. The parents may consent to have their child done, but in very rare instances will they themselves undergo treatment.

Amongst the Chinese and in the Philippines vaccination to a certain extent has been going on ever since it was first introduced. The arm-toarm method has been carried on, after a fashion, during the whole of the nineteenth century, but the virus used at the end of the century was the result of the vaccinations made at the beginning of the century, for the lymph was kept alive by arm-to-arm vaccination merely. The result was an expended and exhausted lymph and an imperfect or wholly abortive protection. Vaccine matter, as we know, loses its power as it passes from arm to arm after a certain time-some eight or nine transmissions; but when continued for a century its attenuation must be reduced to the minimum.

Pustules, the result of vaccination by a Chinese "doctor" using the arm-to-arm vaccine matter, are quite small, about the size of a pea, and set up but little local irritation. Consequently the Chinese prefer the milder form of acquiring "protection," holding that the European matter is "too strong for them." They in fact go through the form of vaccination without being in any way protected. With such attenuated lymph it is no wonder that vaccination has fallen into disrepute amongst a keenly observant people like the Chinese.

When reporting therefore upon the protection afforded by vaccination amongst the better-known Oriental people, it is necessary to take note of these facts, and to remember that the native may have gone through the form of vaccination without being in the least protected. That small-pox is rife in the East every one knows, and it behoves all travellers to get revaccinated before

starting from Europe; and all residents in warm climates should be revaccinated every time an epidemic of the disease threatens in their neighbourhood. Sanitation may be the ideal form of protection against small-pox, but the Orient is not yet sanitary; and even the most rabid Antivaccinationist, if he means to travel, will be wise to drop his fad for the nonce. Anti-vaccinationists, however, like most other narrow-minded faddists, seldom travel; did they do so their "Leagues," or whatever they style themselves, would soon cease to exist, and their pernicious and damaging doctrines be heard of no more.

#### MEDICAL OFFICER OF HEALTH FOR BANGKOK.

THE RETIREMENT OF DR. P. A. NIGHTINGALE.

Dr. H. Campbell Higher has been appointed Medical Officer of Health for Bangkok in place of Dr. Highet holds the Dr. Nightingale, resigned. D.P.H. diploma, and is well qualified to take up the important post vacated by Dr. Nightingale. We have been indebted to Dr. Highet from time to time for excellent articles on tropical ailments which appeared in the Journal of Tropical Medicine and other journals; and his devotion to his profession was practically evidenced by the fact that recently, when at home on a holiday, he took out the course at the London School of Tropical Medicine.

Dr. Nightingale's retirement from Bangkok is much regretted by the whole of the foreign native community in the capital of Siam. He had thrown himself so heartily into the public work of the city, and had accomplished so much in the direction of public health improvements, that his retirement is looked

upon as a public loss.

It was Dr. Nightingale who founded the Sanitary Department of Bangkok, which, during the past five years, has done so much for the sanitation of the city. He organised the office of the Port Medical Officer, established a system of quarantine and medical inspection on the most modern, i.e., British, lines, with the result that plague has been completely warded When rinderpest raged throughout Siam, and the exportation of cattle to Singapore and elsewhere was threatened to be stopped, Dr. Nightingale took the matter in hand, and by a judicious and careful system of inspection was able to satisfy the requirements of the government of the Straits Settlements and other governments, and the trade in cattle-one of the most important -was allowed to continue. The gain to the community by his action proved of great commercial importance.

Dr. Nightingale was consulting physician at the palace, and the members of the royal family frequently availed themselves of his services. Of the many other public health and professional services rendered by Dr. Nightingale, we may mention that he was medical officer in charge of the Bangkok police, the public abattoirs were erected under his supervision, slaughter-houses were controlled, &c., &c.

This long list of good work testifies to Dr. Nightingale's organising ability, his knowledge of public health, his tact in dealing with foreigners and natives, and we can well understand that the residents in Bangkok regret his retirement and look upon it as a public loss. The cause for his retirement was unfortunately due to his wife's state of health; but we are sure that wherever Dr. Nightingale settles, whether at home or abroad, he will make his mark and be welcome.

### Obituary.

#### THE LATE PATRICK THURBURN MANSON, M.B.London.

In our last issue it was our painful duty to record the death of this young and promising physician, and with the present number of the Journal we issue his photograph taken shortly before leaving England for Christmas Island.

Patrick Thurburn Manson, son of Dr. Patrick Manson, C.M.G., F.R.S., LL.D, was born on August 20th, 1877, at Amoy, China. He received his early education at Dollar Academy, Perthshire, and Harrow. Amongst his schoolfellows he was held in high estimation for his athletic capabilities, and as a football player he was especially distinguished. He entered as a student at Guy's Hospital, London, and after holding several of the important clinical posts open to students at the Hospital he graduated M.B.London in 1900. During the summer session of 1901 he went to Aberdeen to study pathology under Professor Hamilton of the University of Aberdeen, and returned to London to work at the London School of Tropical Medicine. Whilst attending the course of Tropical Diseases he was attached to the Seamen's Hospital at the Albert Dock as one of the Resident Medical Officers, and did a great deal of medical, surgical and clinical work in the wards, and in the large out-patient department of the Hospital.

It will be remembered that in the autumn of 1900 Dr. Patrick Thurburn Manson was one of the two volunteers who submitted to be bitten by malariainfected mosquitoes brought from the Roman Campagna. This experiment, initiated and carried out by his father, Dr. Manson, was undertaken for the purpose of conclusively proving the possibility of malaria-infected mosquitoes carrying infection to places far removed from the spot where they imbibed their dose of parasites. Young Manson readily came forward to be experimented upon and to test the truth of the doctrine of malaria-mosquito inoculation. All the world knows the result of that experiment: how that Dr. Manson and Mr. Warren were bitten by these mosquitoes from the Campagna, and how both after a short period of

incubation developed benign tertian fever. was not the only point proved by this experiment, for some nine months afterwards Dr. Thurburn Manson had a recurrence of fever, an account of which was communicated by him to the British Medical Journal. Several such recurrences took place, some of which were of marked severity. peculiar latency of malarial infection in a nonmalarial country was thus proved as a scientific fact. These recurrences of fever, although very severe at the time of the attack, had no effect upon young Manson's fine physique, and he threw off the effects of the paroxysms of fever quite readily.

His father, Dr. Manson, had long contemplated a thorough investigation of one of the most deadly scourges of certain tropical countries, namely, Beriberi. It is only those familiar with the Far East who can grasp what Beri-beri means. To the medical man its presence has long been a puzzle and its cure by drugs an impossibility. To the merchant and employer of labour the ravages of Beri-beri have proved ruinous to many an enterprise; and British traders in the Malay Peninsula, in the Malay Archipelago, as well as the Dutch in Java and Sumatra, know but too well what terrible havoc it plays in plantations, on board ship, and wherever it attains a

Dr. Manson has long urged the necessity for a scientific investigation of this disease, and when Beriberi broke out in Christmas Island, off the coast of Java, he turned his attention to the possibility of sending out a commission to deal with the matter. Dr. Durham, of the Liverpool School of Tropical Medicine, was selected as one of the commission. Than Dr. Durham no more suitable investigator could have been found. Although just returned from the West Indies, where he nearly lost his life from yellow fever which he had gone to investigate, he nerved himself for yet another and more distant journey, and proceeded to Christmas Island in November, 1901. His confrère was P. Thurburn Manson, who by his education, his training, his keen scientific spirit, and enthusiasm for investigation, was eminently qualified to undertake the laborious and self-sacrificing task. We know the rest: how shortly after his arrival at Christmas Island he met with the accident which terminated his life, and how the sad news was received in this country. These we referred to in our last issue, but it will be a long time before the shock of the news of his untimely end subsides, and as long as science and her findings are revered so will the name of Dr. Patrick Thurburn Manson live, and his memory will ever continue green amongst us as one of those who laid down his life for others.

TREATMENT OF BILIOUS HEMOGLOBINURIC FEVER.-Dr. Paucot recommends subcutaneous injections of 200 to 300 cc. of chloride of sodium, 10 per 1,000, in the treatment of bilious hæmoglobinuric fever. seven cases thus treated by Dr. Paucot six recovered. -Arch. de Méd. Naval., Sept. and Oct., Paris, 1901.

#### THE MALARIA EXPEDITION TO NIGERIA.

The published reports of the Expedition sent by the Liverpool School of Tropical Medicine to study Malaria and other Tropical Diseases in Nigeria have been for some time before us. A careful study of these reports bear testimony to the care, labour, and scientific acumen and enthusiasm of the several members of the Commission, and their work abounds with a number of real additions to our knowledge.

The objects of the present Expedition were as

(1) To further explore West Africa to ascertain under what varied conditions mosquitoes of the genus *Anopheles* lived and propagated, with a view of ascertaining the most feasible and practical

methods of preventing malarial fever.

(2) To investigate the conditions under which malarial fever is conveyed to Europeans.

(3) To corroborate and extend recent discoveries

and researches on the subject.

It was not intended to limit observations to malarial fever alone, but to study also other tropical diseases as opportunity arose, and to note in addition the general sanitary condition of the places visited.

History of the Expedition.—Nigeria, Northern and Southern, were chosen for the field of operations.

The expedition consisted of :-

H. E. Annett, M.D., D.P.H.(Vict.), Demonstrator in Tropical Pathology, Liverpool School of Tropical Medicine; J. Everett Dutton, M.B., B.Ch.(Vict.); J. H. Elliott, M.D.(Toronto).

One of the most interesting investigations undertaken by the Commission, and which we here reprint, was in connection with

THE RELATION BETWEEN FILARIA NOCTURNA AND FILARIA DIURNA.

The many points of resemblance between the embryos of these two worms suggest the question of their identity, and in favour of the view of their identity many facts can be brought forward. In consequence of the importance of the subject, and the many points of interest involved therein, we propose to treat of the arguments for and against in some detail; and to arrange them under some chief headings.

Geographical distribution.—As has been already pointed out, the distribution of elephantiasis (caused by the presence of the adult form of F. nocturna in the lymphatic vessels and other sites) is extremely wide; but limiting ourselves to the distribution of F. nocturna, as determined by the presence of embryos in the blood, it corresponds in certain regions with that of F. diurna—the two occurring side by side throughout large tracts of country. On the other hand, however, there appear to be many lands where F. nocturna alone is found; but as far as is at present known, in no district has it been shown that F. diurna prevails alone. Reference must again be made in this connection with the conditions occurring in some of the Islands of the Pacific, already mentioned, where elephantiasis is very prevalent, and an embryo occurs in the blood of many natives, which resembles very closely F. nocturna, yet shows none of its characteristic periodicity.

The microscopical appearances of the embryos.—It has already been stated that in West Africa we were unable to distinguish the embryos in the blood of natives infected with F. nocturna and F. diurna respectively, by any means whatever. They appeared identical in their appearance, characters, measurements and movements in fresh preparations, and correspond in length, breadth, staining reactions, and in the possession of the same number of "spots," situated at similar points along the length of the worm and of the same shape and size. The sheath, a common feature of each, appeared identical. Moreover, the West African F. nocturna resembles very closely that of China and India as described by Manson.

The numbers in peripheral blood.—Here, again, there is a close similarity between the two worms. An ordinary case of either infection presents from twenty to sixty embryos in a drop of blood from the finger, at the time when the maximum number is present in peripheral blood—although in each case so many as four to five hundred may be present in

exceptional infections.

Periodicity.—It was this phenomenon, and this alone, which led Manson to regard F. nocturna and F. diurna as distinct species. And certainly, in the limited condition of the knowledge of the subject, it was a very natural conclusion, one large set of cases which had been examined showing a characteristic periodicity with a maximum number of embryos present in peripheral blood at midnight, and a smaller set presenting the reverse conditions, a maximum number at midday. The departure from this interesting regularity to be first noted was recorded by Thorpe in the Tonga Islands, where a large percentage of the adults showed symptoms of elephantiasis, and where an examination of a large number of natives proved the presence of embryos in their peripheral blood both during the day and during the night in approximately equal numbers, and moreover showed that the embryos were present through the whole of the day.

We have already given details of several cases illustrative of the same conditions, and furthermore we have shown that cases of filarial infection occur in whom the hour at which the maximum number of embryos is present in peripheral blood is not midday and midnight, but may be any other hour—3, 6, or 9 a.m. or p.m. And besides we have shown that "pure" cases of F. diurna and F. nocturna are considerably less frequent in West Africa than these

irregular cases.

The definitive hosts.—Thorpe, probably bearing in mind the classical experiment of Mackenzie, and the repetition of that experiment in another case by Manson, by which it was proved that by a change in the habits of a case of F. nocturna, the periodicity of the embryos could be completely inverted, becoming thus similar to that of F. diurna, explained the peculiar phenomenon of the occurrence of the embryos in the blood of the natives of the Friendly Islands by the habits of the natives, which he thus describes from Mariner's classical account of the Tonga Islands.

"The natives employ themselves in conversation not only at any time during the day but also at night. If one wakens, and is not disposed to sleep again, he wakens his neighbour to have some talk. By and by, perhaps they are all roused, and join in the conversation. It sometimes happens that the chief has ordered his cooks in the evening to bake a pig or some fish and bring it hot in the middle of the night with some yams. In this case the torches are lighted, and they all get up to eat their share, after which they retire to their mats; the torches are put out, some go to sleep, and others talk perhaps till daylight."

Similar habits are in practice among the natives of the whole of West Africa, but to a larger extent and on a larger scale. We were often told by natives from different parts of the Coast that it is a common practice in the respective countries to which they belong to sing and dance the whole night through, especially on moonlight nights. In fact we have ourselves heard the midnight orgies in the native towns which we visited, and especially of the Kroo boy gangs in the towns of Southern Nigeria. Moreover, we often observed, especially in those towns where civilisation was very backward, the natives asleep during the middle hot part of the day; indeed the Kroo boy in English Government employ steals a midday nap whenever he can. These habits have been practised, no doubt, for generations, and probably were prevalent to a much greater extent for years before the influence of Europeans was felt. Such conditions would, in a great measure, account for the variety in the cases of filarial infection we met with in West Africa, and which Thorpe observed in the Friendly Islands, and point strongly to the identity of the two embryos, or rather to the phenomenon of the accommodation of the one or the other or of an original embryo perhaps exhibiting no periodicity whatever, to the varying habits of the natives who formed their habitat.

The intermediary host.—F. nocturna has been successfully cultivated in several species of mosquitoes of both genera. In West Africa, after several attempts, we were able to cultivate this embryo in Anopheles costalis; but all our efforts to cultivate F. diurna failed. But this is not remarkable, for, if F. diurna had been evolved in consequence of the habits of the natives, it is not unnatural to expect that its intermediary host is an insect, probably a mosquito, not essentially nocturnal in its habits such as A. costalis, but one whose habits are diurnal.

Analogy with avian filariasis.—In the chapter on avian filariasis we describe eleven new species of filariæ, each having a different embryo; in fact, we were soon able after a little practice to decide the species of the worm even by a study of the stained specimen of the embryo. Each species then possesses distinct adults, which give rise to a characteristic embryo. This would suggest a similar condition among human filariæ, and thus that F. diurna and F. nocturna, being indistinguishable in fresh and stained specimens, have a common adult form

The adult form.—The adult of F. nocturna is well known—F. bancrofti. The adult of F. diurna has

not yet been described, unless F. loa be that form. Now, the distribution of F. loa is, as far as we can ascertain, limited to the West Coast of Africa, and Manson makes the same statement. It has not been met with in any other part of the world,\* and the occurrence of a worm of the length of F. loa occurring under the conjunctiva of the eye, cannot possibly have been overlooked anywhere.

F. diurna, as far as we at present know, is also apparently limited to the West Coast of Africa, and has been found in some cases of natives in which F. loa has been removed from the eye—although this is not remarkable as anything more than an ordinary coincidence, considering the prevalence of F. diurna cases on the coast. Moreover, cases of F. loa have occurred in which no embryos could be demonstrated in the blood.

The conditions in the Friendly Islands, previously often referred to, may perhaps be quoted as an exception to the statement above—that F. diurna is limited in its distribution to West Africa-since the embryos cannot be regarded as nocturnal. Probably this condition will be found to be much more extensively distributed. On the other hand we have described the embryos of F. loa as very similar to those of F. nocturna: but on closer study some points of difference may be noted in the disposition and number of the spots. Such a close resemblance indicates either that they are identical with F. diurna, and that, therefore, F. loa is the parent form of F. diurna, or that, being very much alike in all other respects in the matter of the spots as just mentioned, they are intended for a more or less similar life history in their intermediary hosts.

To sum up, although the weight of evidence is on the side of the identity of F. nocturna and F. diurna, there are many points which remain to be cleared up before the question can be settled. The F. loa has introduced a serious difficulty into the subject, and it appears to us that a solution of the mystery can only be obtained when the embryos in a pure case of F. diurna have been successfully and completely cultivated in their intermediary host—which is still to be discovered—to the final larval stage, and perhaps it may become necessary to perform experiments of infection of man by the use of infected intermediary hosts before a complete solution is procured.

## DR. W. E. LLOYD ELLIOTT'S ARTICLE ON PANI-GHAO.

THE Editors wish to notify that the excellent article on "Pani-ghao, the Water Itch or Sore Feet of Assam Coolies," which was published anonymously in the Journal of Tropical Medicine, December, 1900, was communicated by Dr. William E. Lloyd Elliott, M.D., Medical Officer of the Assam Frontier Tea Co., Dibrugarh, Assam. This article is referred to by Dr. A. B. Dalgetty in the Journal of Tropical Medicine for March 1st, 1901, and in a foot-note the Editors

<sup>\*</sup> Stossich states that it occurs in the Antilles and Guiana, but Manson says, in the latest edition of "Tropical Diseases," 1900, "It is peculiar to the West Coast of Africa."

explain how the paper came to be published "anony-

The Editors wish to express their regret that an article of such high merit and indicative of such close scientific study should have been published without Dr. Elliott's name being appended to the manuscript.

### Article for Discussion.

## THE DANGERS OF SUBCUTANEOUS INJECTIONS OF QUININE.

By Aubrey Hodges, M.D.Lond. Medical Officer, Uganda Protectorate.

THE very great therapeutic value of this form of administration of quinine is, I suppose, generally acknowledged, and in offering the question of its dangers for discussion, the JOURNAL OF TROPICAL MEDICINE implies the importance of collecting the varied experiences of medical men in its use, and also the advantage likely to be gained by careful study of such untoward accidents as, from time to time occurring, may act as an unfortunate deterrent from its confident and prompt employment.

If statistics could be collected of these accidents (abscess, slough, tetanus) which have followed subcutaneous injection of quinine, with details as to the precautions taken, the salt used, the site chosen, and the condition of the patients injected, they would probably form a step towards the explanation of their occurrence, and possibly a guide for their avoidance in future.

I have been in the habit of employing hypodermic injection as a routine treatment in all bad cases of malaria, in blackwater fever, and in such milder cases as did not yield readily to the administration of quinine by mouth, and hitherto I have derived nothing but encouragement from the practice. I do not know, of course, how soon it may be my misfortune to be confronted with an abscess or a slough, but up to the present this has been spared me, and I have seen no worse mishap than a little inflammatory swelling which has disappeared after forty-eight hours at the farthest.

It having been formerly my lot to inject large quantities of diphtheria antitoxin, I have followed with quinine as nearly the same method as circumstances would allow. Whether my freedom from accidents has been due rather to the constitutions of my patients or other causes than to the manner of my procedure I cannot say. My method is very simple, for one works (out here) under somewhat primitive conditions. But probably it does not differ essentially from others commonly in use. It is as follows:—

First, I have a soup-plate scalded and filled with boiling water. In this I place a tablespoon and a teaspoon which have previously been cleaned and boiled. Then, having boiled in a test-tube the water necessary for making the solution, I turn it out into the empty tablespoon, in which I triturate the salt or tabloids to be dissolved with the convex of the tea-

spoon, so as to ensure perfect solution and freedom from grit. I thus have the liquid in a receptacle convenient for taking it up quickly with the syringe, while the hot water in the plate prevents cooling and precipitation of the drug during the next step, which is to boil the needle, with the wire in it, in the testtube. This done, and the wire removed, the needle is immediately plunged into the site chosen for injection (previously prepared) and remains there until the operation is finished, no matter how many syringefuls are required to complete it. Other soluble drugs, such as morphia, strychnia, or pilocarpin, may be added to the injection if needed at the time. If no test-tube is at hand the tablespoon may be used for boiling the needle, which is then straightway inserted, and the water for solution afterwards also boiled in the spoon. Both syringe and needle are carefully cleaned after operation as well as before, and I need scarcely refer to the care of one's own hands. I use, when possible, distilled water both for making the injection and for boiling the needle, but more often I have had to use ordinary filtered water, and sometimes I have been obliged to dispense even with filtration.

In my opinion the best needle for the purpose is a steel one with not too fine a bore, and probably a syringe to hold from 2 to 4 drachms would be more convenient than the ordinary hypodermic which I have hitherto used. I have employed either the hydrochloride or the bi-hydrochloride salt, of which I prefer the former as being less irritant; and I have also used the hydrobromide, but found it liable to block the needle and less easy to give in large doses. My maximum dose for one injection has been 30 grs. I have frequently given 15 grs., and more often 10 grs. or less.

There is no doubt in my mind that by far the best site for injection is the buttock, into the muscles of which the needle should be deeply plunged. I think, however, that this site is in a measure contraindicated, as also the scapular region, by emaciation of the patient, or previous prolonged confinement to bed. Next in order I prefer the abdominal connective tissue, where I inject in the same manner as diphtheria antitoxin is injected. Failing these, I use the scapular region, in which, however, I have found that there is more after-discomfort to the patient. I do not think that such parts as the arm or front of the thigh are suitable for quinine injection, and some of the abscesses of which I have known have occurred in such situations.

Apart from sepsis, the most obvious precautions seem to me to be able to avoid undue irritation and to minimise tension in tissues in which the circulating blood is itself the seat of wasting disease, in which adjustment and repair are for the time being at a low ebb, and the process of absorption is probably not at its best. Injections should not, I feel certain, be repeated in or about the same spot until all signs of local reaction from previous injection have disappeared. The three regions favourably noted above offer six different sites, which may be used in turn. Quinine solution is undoubtedly irritant, and becomes more so if acid has to be added, as in dissolving the sulphate, and the tension from the volume of liquid employed

is considerable if it is too rapidly injected, or if an unsuitable part is chosen. The fluid should be injected slowly, to allow of gradual distension of the tissues, and into a part which is capable of such distension without undue injury. Also I think the solution should not be too concentrated, and I therefore always add more water than is required to dissolve the drug.

It has seemed to me that the larger the dose the greater has been the reaction or irritation, but I have not found that an injection repeated at a spot where all swelling and tenderness had subsided gave rise to

any more trouble than the original one.

In order to avoid too frequent subcutaneous injections of quinine, I have in many cases exhibited it in enema, and, in fact, have found it a very sound plan to begin by hypodermic injection, and afterwards, as far as possible, to keep up the effect by enema. I have been struck by the usefulness of the hydrochloride for this purpose. I have found quininism produced almost if not quite as quickly as if the drug had been taken into a healthy stomach. I give it along with the nutrient enemata (peptonised milk and meat essence) which are usually needed at the same time, and with it any other soluble drugs which may be necessary. The addition of a little brandy, which is often itself required as a stimulant, makes the quinine readily soluble at the proper temperature, and I have found little difficulty as to retention by the bowel, with proper care, even in the worst cases. I may mention that, in a case which I hope soon to report, a single ½-gramme dose in enema appeared to produce immediate hæmoglobinuria in a patient with a history of quinine idiosyncrasy.

Very likely irritation, tension and septic inoculation do not cover the whole ground of the causation of quinine abscess. I have heard anæsthesia at the site of injection mentioned as having occurred, apart from tissues about to slough. Is it possible that these abscesses may sometimes be in some way analogous to bedsores? Are they ever due to impaired nerveinfluence caused by the action of the drug itself?

### Rebiew.

CLINICAL PATHOLOGY AND PRACTICAL MORBID HISTOLOGY. By T. Strangeways Pigg, M.A., Demonstrator of Pathology in the University of Cambridge. Messrs. Strangeways and Sons, London. 1901. Pp. 167. Illustrated.

Mr. Strangeways Pigg has given us a most useful book. Compact, clearly printed, interleaved for notes, and illustrated, the book is eminently suited for

practical work.

The Clinical Pathology of Blood is dealt with in thirty-one pages; four pages are devoted to the sputum; and the subject of urine extends over sixteen pages. Diphtheria, ringworm, gonorrhæa, and pus receive special attention; the clinical diagnosis of each by microscopic methods being carefully gone into. Practical Morbid Histology occupies the last twenty-two pages of the book.

The whole work is evidently the production of a teacher, who not only knows his work, but knows how to teach. There is no redundancy in the text, yet no detail is left in confusion or to the imagination. To the physician in the tropics who has to take up investigation on his own behalf and with no one to advise him as to methods, this book must prove indispensable. All details necessary for preparing apparatus, for bacteriological methods, for recognition of bacteria, diseased cells and tissues by the microscope, &c., are clearly and intelligibly given.

Mr. Strangeways Pigg's book affords a complete and infallible guide, whereby the student and practitioner working alone can acquaint himself with the practical methods necessary for research in pathological investigation, or in any clinical work which

he may have to undertake.

### Rews and Notes.

Dr. Neild Cooke, Health Officer of Calcutta, has been re-appointed for a further period of three years. Dr. Cooke is coming home on leave this summer.

A PUBLIC memorial is to be raised to the late Surgeon-General R. Harvey, C.B., Director-General of the Indian Medical Service.

TURKISH officials require that all medicines imported into Turkey shall meet the requirements of the French pharmacopæia, and that all formulas should be written either in French or in Turkish. Quantities and proportions must be clearly stated, and the names of drugs must be given in purely scientific, as opposed to popular, nomenclature.

A PUBLIC health laboratory has been opened and fitted up in Bangkok under the direction of Dr. H. Campbell Highet.

## Current Viterature.

BEEF-WORM IN THE ORBITAL CAVITY.
By Thomas W. F. Gann, M.R.C.S.Eng., L.R.C.P.Lond.,
L.S.A.

District Surgeon, Corozal, British Honduras.

To anyone who has lived for any length of time in either Central America or South America the parasite known as the "beef-worm" must be familiar either from hearsay or possibly from painful personal experience, as, though fortunately not of common occurrence, it is one of the most distressing and painful of the innumerable insect pests of these regions.

The creature starts in life as an egg, which being laid by the parent fly beneath the human skin or mucous membrane soon hatches out into a small worm, which rapidly increases in size and reaches in a few months a length of from one to two inches and a diameter of from three-eighths to three-quarters of an

inch. The worm is of a dull greyish-white colour, divided into from twelve to twenty segments and covered by stiff black hairs or bristles, according to its age, along the middle two-thirds of its body, each segment possessing a separate row of hairs completely surrounding its anterior and posterior margins. The tail end communicates with the exterior by a circular orifice surrounded by a prominent raised margin, the head end being deeply embedded in the tissues and supplied with two strong, semi-circular, black hooks, by means of which it attaches firmly, rendering its expulsion extremely difficult. It advances and withdraws its tail with a sort of rhythmic motion which gives rise to the characteristic sensation of "something moving and alive" within the swelling caused by it upon the skin or mucous membrane. The parts most affected by this parasite are the extensor surfaces of the arms and legs, the back, and shoulders and the chest; but exceptional cases have been recorded of its occurrence in the face and even upon the penis.

Certain individuals appear to be particularly susceptible to the worm, and if one of these should go into a district infested by it he is practically certain to become the host of one or more. Negroes are far more susceptible than are whites. Other persons, again, appear to enjoy complete immunity from the pests; they may go into a district swarming with the worms, sleep on the ground out of doors without a net for months at a time and never get a single one, though other persons of the same colour and nationality would under similar circumstances be literally eaten alive. The worm appears to be limited to small and clearly-defined districts within which a man may, if he sleeps uncovered for a single night, be almost certain of contracting it, though less than a mile distant perfect immunity is enjoyed.

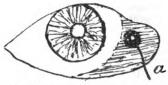


Fig. 1.—Rough diagram of the eye of the patient, the shaded portion indicating the inflammation and protrusion of the inner canthus. a, Circular aperture with prominent raised margin through which the tail end of the worm protruded from time to time.

The present case of a beef-worm in the orbit is, so far as I am aware, unique. The patient, a Spanish lad, about 18 years of age, came to me on September 16th, 1901, stating that he had been living for some considerable time in the bush and that during the last three months he had been suffering from pain and inconvenience in the left eye, together with a sensation as if something were moving about within the socket. On examination the eye was seen to be a good deal more prominent than its fellow; the conjunctiva was more or less congested throughout its whole extent, and the entire inner canthus of the eye was enormously bulged forward. Immediately to the inner side of the caruncula lacrymalis was a circular opening about one-twelfth of an inch in diameter, surrounded by a prominent rim, and at the bottom of this opening

appeared a small, whitish knob which from time to time was slightly protruded beyond the opening, but if touched it was immediately withdrawn so far back as to become almost invisible (fig. 1). The negro method of treating the worm is first to cover the hole over with a plug of wet tobacco for a day or two, and then with great force to squeeze it out, the tobacco appearing to make the creature lose its hold with the hooks attached to its head. This method was obviously impossible in the eye, so I injected a few minims of a



Fig. 2.—Rough diagram of the beef-worm. h, Head, showing two short black hooks with which the worm affixes itself to deep tissues; t, tail; and b, bristles. These bristles are set in rows around each segment of the middle two-thirds of the worm.

strong solution of tobacco into the aperture with a hypodermic syringe and then covered it over with a plug of moist tobacco-leaf and left it for a couple of hours. On removing the tobacco-plug I found the creature much less active, and after some little trouble I managed to seize the tail-end with a fine forceps and little by little to withdraw the whole worm. The patient made a good recovery and did not lose the sight of his eye.

I enclose a rough sketch and two photographs of the worm (figs. 2 and 3), as well as the creature itself



Fig. 3.—(a) The ventral aspect, and (b) the left dorsal aspect—of the actual worm; life-size. From photographs.

preserved in alcohol; it measured when first extracted one and three-eighths inches in length by three-eighths of an inch in diameter and was covered over the middle two-thirds of its body by short dark bristles. It is only about half-grown, as in the full-grown worm these bristles attain a length of half an inch or more.

The curious point about this case is how the fly managed to lay its egg in such an exceedingly sensitive spot as the inner canthus of the eye without the sufferer becoming aware of the fact.—Reprinted from The Lancet, January 4th, 1902, by permission of the author.

#### PLAGUE.

### PREVALENCE OF THE DISEASE.

INDIA.—During the two weeks ending February 22nd and March 1st, there were 12,675 and 21,789 deaths from plague in India. The enormous increase during the latter week is accounted for by a general rise in the death-rate from plague in Northern India. In the Punjab alone 10,525 persons died of plague

during the week ending March 1st. Plague has broken out in Hyderabad (Scinde); between 40 and 50 deaths daily were reported in this district during the first days of March. Between February 19th and March 19th, 50,000 persons died of plague in the Punjab. Calcutta, during the four weeks ending March 15th, 1,488 persons died of plague.

MAURITIUS.—During the weeks ending March 13th and 20th, the number of deaths from plague in Mau-

ritius numbered 7 and 3 respectively.

CAPE OF GOOD HOPE .- On the 1st March but one case of plague remained under treatment in any of the plague hospitals in Cape Colony. No fresh cases were reported during the month of February.

#### LEPROSY.

THE PRIMARY LESION OF LEPROSY.—From time to time the question of a primary lesion in leprosy is brought up for discussion and remark. L. Glück, of Bosnia, in the Wien. Med. Woch., of July 27th and August 3rd, 1901, returns to the subject and describes the initial leprous lesion. Glück, however, states that this lesion is but part of the initial eruption, and therefore can in no sense be termed a primary local lesion such as the primary sore in syphilis. We find this confusion in statement repeated by several writers on leprosy, and we would especially draw attention to the difference between a primary lesion which is of a general eruptive character, and therefore characteristic of general infection, and a primary lesion in the sense of a local sore. That some writers believe they have discovered a local primary infective sore is well known, but confirmation of the matter, even although supported by fairly positive evidence by Sticker, Arning, Daubler, Lutz, and Geill, is by no means conclusive. Lutz and Geill, from observations made in the Dutch East Indies, state that 50 per cent. of the cases of leprosy seen by them appeared in the feet. Sticker, on the other hand, holds that the nose is more often the site of the primary lesion of leprosy. Given a local primary lesion, the question of its removal is one which becomes of surgical importance. So far as excision of the so-called primary lesion of leprosy goes, we have it on the authority of von Bergmann that the excision does not prevent the subsequent appearance of general leprosy. Whether von Bergmann was dealing with a real primary local sore or only with the earliest lesion of the initial eruption is not known. Further exact information on this point is wanted, and although it is difficult to obtain it is not impossible. We are apt to neglect and set aside statements by natives and others of leprosy contracted by a single coitus with a leprous woman as being merely popular ignorance, without a single scientific argument in support of the rejection of the statement. There is much really to be said for the popular idea and it may be correct.

GANGRENE IN ELEPHANTIASIS.—A case of gangrene of the foot supervening upon elephantiasis of the right lower extremity was reported before the Brooklyn Surgical Society by Dr. J. Richard Kevin, in February, 1902. The patient, a woman, aged 22, had had the elephantoid condition since her tenth year, and since 1893, when the limb was amputated, the patient has been married and had two healthy children. It is to be presumed that the elephantiasis is due to filarial infection, and it is interesting to note that the woman lived in the State of Ohio.

#### EXCHANGES.

Annali di Medicina Navale.

Archiv für Schiffs u. Tropen Hygiene.

Archives de Medicine Navale.

Archives Russes de Pathologie, de Médec. Clinique et de

Bacteriologie. Australasian Medical Gazette.

Boletin de Medicina Naval.

Boston Medical and Surgical Journal.

Bristol Medico-Chirurgical Journal.

British and Colonial Druggist.

British Journal of Dermatology.

British Medical Journal.

Brooklyn Medical Journal.

Caducée.

Climate.

Clinical Journal. Clinical Review.

Giornale Medico del R. Esercito

Hong Kong Telegraph.

Il Policlinico.

Indian Engineering.

Indian Medical Gazette. Indian Medical Record.

Janus.

Journal of Balneology and Climatology.

Journal of Laryngology and Otology.

Journal of the American Medical Association.

La Grèce Médicale.

Lancet.

Liverpool Medico-Chirurgical Journal.

Medical Brief.

Medical Missionary Journal.

Medical Record.

Medical Review.

Merck's Archives.

New York Medical Journal. New York Post-Graduate.

Pacific Medical Journal.

Polyclinic.

Public Health.

Revista de Medicina Tropical.

Revista Medica de S. Paulo.

Sei-i-Kwai Medical Journal.

The Hospital.

The Northumberland and Durham Medical Journal.

Treatment.

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1.—Manuscripts sent in cannot be returned.

2.—As our contributors are for the most part resident abroad, roofs will not be submitted to those dwelling outside the United

proofs will not be submitted to those awening outside the Kingdom, unless specially desired and arranged for.

3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Editors.

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

## The Journal of Tropical Medicine.

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In order to meet the constant enquiry for addresses of respectable firms catering for the various requirements so difficult to obtain abroad, we give a list of names and addresses which we trust will be found useful to our numerous correspondents and subscribers.

### Original Communications.

### FILARIASIS IN ST. KITTS, W.I.

By George C. Low, M.A., M.B., C.M.(Edin.).
Craggs' Scholar, London School of Tropical Medicine.

The island of St. Christopher, more popularly known as St. Kitts, one of the West Indian Colonies classified under the group of the Leeward Islands, lies in lat. 17° 18′ N. and long. 62° 48′ W., in the vicinity of Antigua and Montserrat.

It measures about 28 miles in length by about 5 miles at its greatest breadth and consists of a central core or ridge of volcanic mountains, the land sloping more or less abruptly from this to the sea. The soil, which is chiefly covered with sugar cane cultivation, is sandy and porous, and quickly absorbs large quantities of water, any excess being carried off by large watercourses to the sea; these in the winter months are dry, and even after the heavy rains of summer they only flow for three or four days.

Basse Terre, the chief town of the island, lies on the leeward coast, on flat, sandy ground, near the base of the end of the ridge of hills, and is typically West Indian, native huts and dwellings being mixed up in close contiguity with the houses of the better-class white inhabitants. Malarial fevers used to be common in the town, but since the "pond pasture," a piece of swampy ground lying immediately to the south, was filled up, they have almost entirely disap-

peared.

#### PREVALENCE OF FILARIAL DISEASE.

Filarial diseases are very prevalent in the island, the percentage of infections being higher than that in any of the other islands I have examined.

One is at once struck, even without special examinations being made, by the fact that large numbers of the inhabitants are suffering from elephantiasis, or what is known locally as "Barbados legs," and the

medical men practising there also state that the disease is very common, many cases being annually treated in the general hospital and in private.

On the occasion of my visit to the island, the usual procedure for accurately determining the amount of filarial disease was adopted, namely, nightly blood examination of as many people as possible, selection being avoided by taking indiscriminately white people of the better classes, healthy individuals from the streets, and cases in the Colonial hospital suffering from ordinary complaints. Any cases suffering from, or being treated for, filariasis per se, were considered separately for the study of the various features of the disease.

In this way the blood of 143 individuals was examined at night, and no fewer than 47, or 32.8 per cent., were found to be suffering from filariasis. Nine of these, though being treated for various complaints, showed pathological signs of filariasis as well; the other 38 showed no appreciable symptom of that condition, the diagnosis being arrived at solely by finding the embryo of F. nocturna in their blood.

This percentage, as I have already stated, is very high for the West Indies, for Barbados, where the disease is supposed to be very common, has only 12.66 per cent. of the people infected, and the hilly islands of St. Lucia and Dominica, 7.58 per cent. and 7.63 per cent., respectively.

#### Types of the Disease.

Filarial lymphangitis, locally known as "fever and ague" and "rose," is very common, and very few of the white inhabitants have escaped attacks at some period or other of their lives. Chyluria, Dr. Christian Branch informs me, is rare, but lymph scrotum, filarial abscess, varicose groin glands, and elephantiasis are all very common. Many types of the latter disease are seen, affections of the lower limbs preponderating, and some of those are of an enormous size. In addition, cases of elephantiasis of the scrotum, prepuce, penis and breast occur, and in one girl, the

pedunculated groin elephantiasis, described by Corney in Fiji, and Daniels in British Guiana and Fiji, was very marked, the condition being associated with a permanent thickening of the thigh as well.

Many cases with swarms of embryos in the peripheral blood at night showed no sign of any disease, and this class, as the statistics bring out, forms the

large majority of those infected.

Some Points on the Pathology of the Disease.

Embryos in Elephantiasis.—As many blood examinations of elephantiasis as possible were made, and out of a total of 14 typical cases, embryos were found in the peripheral blood of three, a most unusual thing, as may be seen from the fact that up to this time, out of 56 cases (Barbados 18, Trinidad 23, Demerara 15), embryos had only been found once, and this was in the case of a woman from the latter colony, Demerara, where filariasis is very common.

This bears out very completely Dr. Manson's statement "that it is not usual to find filaria in elephantiasis cases in the blood or elsewhere, unless it be in countries in which filariasis is very common and reinfections, or extensive infection highly probable' ("Tropical Diseases," Manson, Second Edition, p. 505).

This fact might be made use of in rapidly determining the presence of infection in any given place, i.e., if one examine a series of elephantiasis bloods and find embryos present in several, it is a certainty that there will be a large amount of the disease (filariasis)

in the place from which they come.

Absence of Embryos after Filarial Lymphangitis.—It is an interesting fact, and one that may help to elucidate some of the obscure pathological changes in this disease, that the night blood of a woman in the Colonial hospital at St. Kitts, who had just recovered from a first attack of filarial lymphangitis, contained no embryos, a similar condition having been noted four times previously in Barbados. The subsequent history of three of the latter was followed for some time very carefully, and blood examinations repeated many times always gave the same negative results. This must mean that in such cases the mature worms have either died, this probably causing the attack, or, owing to the blocking of the lymphatic in which the adult is lying, the embryos can no longer get into the blood stream. Whether or not fresh infection would be required for another attack is difficult to definitely determine, as old cases of filarial lymphangitis, that is, cases that have suffered before, go on having repeated attacks, two, three, or more in a month, even without any embryos being found in the peripheral blood. It is certainly not easy to imagine such individuals being so continually reinfected.

Post-mortem examinations might help to clear the matter up, but the chances of such must be very rare, as people do not die often just after an attack.

"Post-mortem notes of a Filarial Case."—I was for-tunate to obtain an autopsy on a man in Barbados, who during life had a few embryos in his peripheral blood at night, and as the notes are interesting, especially as they corroborate Dr. Manson's results obtained in London, they may be incorporated in this

The man, a negro, had never suffered from any

filarial symptoms, but was the subject of a sarcoma which eventually caused his death, the latter event taking place one morning at 10 a.m.

No adult worms were found, though a prolonged and careful search was made; the thoracic duct was free, as were also the pelvic lymphatics, and there was

no sign of any varicosity.

The fact of there being so few embryos in the peripheral blood pointed to only one or two adult worms and these of course may have been in any of

the lymphatics.

Drops of blood were taken from the various organs in a similar manner to that adopted by Dr. Manson in his autopsy made in London and the results were as follows :-

Organ			No. of Slides	Aggregate No. of Filariæ	Average per Slide	
Lung			4	65	16.2	
Liver			 4	0	0	
Spleen			 4	0	0	
Kidney			 4	0	0	
Pancreas			 4	0	0	
Heart Musc	le, righ	t side	 4	0	0	
,, ,,	left	side	 4	0	0	
Inferior Ver	a Cava	ı	 4	0	0	
Aorta			 4	0	0	

No embryos, it will be seen, were found, except in the blood-vessels of the lungs, and this is in all probability their special seat of selection by day, other neighbouring vessels and organs being inhabited as well when the infection is a large one and the embryos very numerous.

#### CAUSE OF THE DISEASE.

The cause of the disease and its spread by suitable species of mosquitoes has now been so completely worked out, that it is needless entering into its details again here.

It is sufficient to state that Culex fatigans abounds in St. Kitts, suitable places for its breeding existing in abundance. It is much more common than Stegomyia fasciata, agreeing in this respect with the island of Barbados, whereas in St. Lucia and Dominica the reverse is the case. The relative numbers of the two species of mosquito probably have to do with the degrees of prevalence of filariasis in these places.

### PREVENTION OF THE DISEASE.

The prevention of filariasis, which really amounts to a careful personal prophylaxis by means of the mosquito net, and the destruction of the breeding grounds of Culex fatigans, the domestic mosquito, should be an exceedingly easy task for the island of St. Kitts, as the town of Basse Terre is small, and has now the advantage of having water laid on in pipes. The necessity of storing water in tanks and other receptacles, therefore, no longer exists, and such arrangements can easily be done away with.

Another main source of these pests is found, however, in the privy system, which is used throughout the town. The only proper method of dealing with this is to abolish the system altogether for the dry earth one, a substitute I have strongly advocated to the Government.

Other collections of water, such as barrels, tubs and the like, can easily be dealt with by the Sanitary Inspectors when going their daily rounds. Fountains and ornamental tanks for growing water lilies in should have gold fish or minnows introduced, as these

quickly eat up any larvæ present.

It is astonishing how few are the people in the West Indies who use mosquito nets; this carelessness undoubtedly greatly helps the spread of the disease. All the white people of St. Kitts in whose blood I found filarial embryos had never done so, whereas four individuals who had always been most careful in this respect had never shown any trace of filariasis and had no evidence of it in their blood. The figures I possess are perhaps too small to warrant any definite conclusion, but there is no doubt that a more careful personal prophylaxis would soon tend to diminish the disease.

St. Kitts has awakened to a sense of its danger and with praiseworthy energy has taken up the subject in earnest. It will be an interesting study in the course of the next generation to watch the gradual reduction and stamping out in the island of this loathsome complaint.

THE DURATION OF THE LATENCY OF MALARIA AFTER PRIMARY INFECTION, AS PROVED BY TERTIAN OR QUARTAN PERIODICITY, OR DEMONSTRATION OF THE PARASITE IN THE BLOOD.

By Dr. ATTILIO CACCINI,

Assistant Physician, Hospital of Santo Spirito in Sassia, Rome; Lancisi Clinique, under the direction of Prof. Giulio Bastianelli.

(Translated from the Italian by St. Clair Thomson, M.D.Lond., F.R.C.S.)

#### PREFACE.

In the years 1899, 1900, and 1901, Professor Ballori, the Director-General of the Hospitals in Rome, instituted in the several hospitals a special department for the patients suffering from malaria, in order that the very large amount of clinical material in malaria, which is met with every year in the Roman hospitals, might be studied with greater profit.

This special department was entrusted to my care, and I endeavoured to fulfil the task as completely and as rigorously as possible; I seized the favourable occasion for carrying out various studies which I had had some time in mind, on the subject of

malaria.

Before entering on the present publication, I feel it a duty to offer my very warmest thanks to Professor Ballori both for the honour of entrusting this department to me, and also for having on every occasion furnished me with the necessary means in order to do the work thoroughly and bring it to a satisfactory conclusion. I hope that his confidence

has not been altogether misplaced, since I see that the results I have already arrived at have been thought worthy of appearing in the very important Atti della Società per gli studi della malaria, 1901, vel ii p. 100 %

vol. ii., p. 109, &c.

Also I would express my thanks to Professor Giulio Bastianelli, Chief of the Section in which I particularly made my observations. I would also like to place on record the kindness and politeness of each and all of the physicians of the Hospital of S. Spirito, who always favoured me with notes on the patients I had under observation in their sections; and I would particularly mention Dr. Scipione de Rossi, who often came to my aid with wise counsel, and also Dr. Alphonso Cortini, who gave me his patient and cultured assistance. I would also thank for their assistance the physicians of the Ambulanze della Croce Rossa, to many of whom I am indebted for the following observations being complete and exact.

#### Chapter 1.—Introduction.

During the years 1899, 1900, and 1901, when studying the malarial patients in the Hospital of S. Spirito in Rome, I was able to collect numerous observations.

Of the results obtained from my observations of various points I have already published some of them, while others are in course of publication.\*

In this memoir I intend to record the observations instituted on the duration of the latent period of malaria after the first infection, an investigation of much importance, but which up to the present has presented numerous uncertainties and contradictions between authors.

For this purpose it is necessary to refer to the standard which has guided me in differentiating cases of relapse from those of true primary infection. All my observations are based on considering as relapses "the successive reappearance of one or more infections which, without ever becoming cured, are reproduced at various intervals, the epidemic having ceased during all the healthy months, continuing until the new epidemic year or even longer, sometimes for several years" (Celli, Atti della Società di studi sulla malaria, 1901, vol. ii., p. 88).

This was the criterion that guided me in the present work. Now I would describe briefly the method on which I conducted my researches on the subject.

Chapter 2 .- Material and Methods of Study.

From every patient with malaria who entered the hospital I carefully collected both the previous and recent history, trying to secure the most minute points upon previous illnesses, on the localities where the patient had contracted the infection, on its duration, and on the quality of the fever. To verify the dates of the progressive infections I found great

Alcune osservazione sull'epidemiologia della malaria, Dottor A. Caccini, Policlinico, 1901.

Sul comportamento dell'epidemie malariche, 1900-1901, studiate allo Ospedale di S. Spirito in Roma. Dottor Caccini, ecc., ecc.

<sup>\*</sup> La Febre Quotidiana Estiva—Quotidiana Vera—Pel Dottor Attilio Caccini, Policlinico, 1901.

assistance in the clinical records of the hospital, for a good number of the patients had been treated on previous occasions in the Hospital of S. Spirito. Often the records of other hospitals outside Rome were of great assistance to me, when the patient mentioned the city where he had been treated. In this way I was able to ascertain in every case the date and duration of the progressive infections, as well as their quality. Often I was also able to secure exact notes of the treatment they had had.

I found besides that the information furnished by the patients themselves was almost always exact, especially in regard to the quality of the infection, and to the periodical reappearance of the febrile attacks. In this way, by means of the history, I was able to follow the patient accurately, either during his infection, or during the relapses. I devoted special attention to the various treatments received, to the quality of the remedies, and to their method of administration—especially in regard to quinine-to methods of life, to conditions of habitation and locality, and to occupation or profession. In this way I was able to find out satisfactorily the part played by each in the renewal of new infections, and also particularly in the renewal of febrile attacks and relapses. I also endeavoured to ascertain what influence on the renewal of the fever was effected by the atmospheric variations, either by themselves or in relation to the occupation of the patient (cold, heat, moisture, dryness, rain, barometrical variations).

I took particular note of the type of fever in each infection and relapse, of the duration of each successive apyretic period, whether under the influence of quinine or on the spontaneous exhaustion of the fever.

I kept in mind that an infection or a relapse may pass unobserved for some time from the fact that it presents irregular symptoms (malaise, weakness, sweats, headaches, gastro-intestinal disturbances, hæmorrhage, &c.) without elevation of temperature.

To all these observations I added the systematic observation of the blood (which I repeated several times for every patient in both fresh and coloured preparations) and the study of the temperature curve and the clinical progress.

There were specially brought to my notice many individuals who were hospital visitors at S. Spirito every time that the fever seized them. I was able to follow certain of them for quite three consecutive malarial years. Contemporaneously with all these hospital researches I carried out other observations in certain localities in the Roman Campagna, which the facts I was gradually collecting indicated to me as places of particular interest for the study of the relapses. In this way I followed my patients from the hospital into the fields, and availing myself of the kind consent of the Director (Professor Ballori) I submitted these patients, where it seemed to me indicated, to treatment either by quinine, arsenic, or iron. Of these patients certain of the more intelligent voluntarily presented themselves for observation, and came at fixed periods to the hospital to be examined and to report to me on their companions during the intervening period. Most usefully helpful were the notes furnished to me by the doctors of the communes, and from the doctors of the Ambulances which the Croce Rossa had stationed in the vast Agro Romano. Almost all the cases were studied along with their temperature charts, and in association with the cycle of development of the parasite in the blood.

#### Chapter 3 .- General Survey.

Of the patients studied in the three years, 1889 to 1901, I limit myself to reporting the facts collected between June 1st and December 31st for 1900, and from June 1st to November 15th of the year 1901. These will be found in the following table. Numerically the figures of these patients seem to me sufficiently convincing, hence I refrain from adding the cases collected in 1899, limiting myself to referring only to such of these as, from their special behaviour, presented anything particularly characteristic. In regard to 1901, the observations are still continuing, but in any case I limit myself to detailing, as I have said, those observed up to November 15th. I will report those observations since that date which appear to me to be worthy. It is well to note that I have absolutely excluded all the patients who gave negative results by the microscopical examination of the blood, and in whom the observations for some reason or other could not be completed, or who presented mixed infections. The following is the record of the cases of malaria considered by me in the period recorded.

Summarising it, we have: -

(a) Benign tertian—764 cases in 1900; 1,256 cases in 1901. Altogether 2,020 cases, of which 1,086 were regarded as primary (of these a good number came under obervation during relapses), and 934 regarded as relapses.

(b) Malignant tertian—2,325 cases in 1900; 1.379 cases in 1901. In all, 3,704 cases, of which 2,275 were regarded as primary, and 1,429 as secondary.

(c) Quartan—415 cases in 1900; 440 cases in 1901. In all, 855 cases, of which 525 were primary, and 330 relapses.

Chapter 4.

In view of the enormous amount of material I have felt the necessity, in order to facilitate explanation and analysis, of making many classifications. I will therefore proceed to dilate upon certain constant data which impressed themselves on me from the first year of observation, and from which I have been able to draw up the following conclusions:—

(1) When an individual has been attacked by malarial fever, however it is treated it may happen that after a certain latent period the fever reappears.

(2) The relapse may take place (a) after a short interval (b) after a long interval

interval, (b) after a long interval.

(3) In the relapses with short interval, the manner

(3) In the relapses with short interval, the manner in which the clinical treatment of the primary infection has been carried out has a very great influence on the relapse itself, or at least on the number, gravity, and nature of the relapses.

(4) In the relapse, after a long interval, we constantly find, as determining factors of the relapse, the intervention of certain accidental factors which, on the other hand, in the relapses after a short interval.

act only as aggravating and not as determining causes, that is, abbreviating the latent period.

Having stated this much, and to avoid useless and continual repetitions, I will proceed to succinctly state what are the above mentioned factors, and in what manner their action takes place.

#### PART I.

FACTORS WHICH EXPLAIN THE CAUSES OF RELAPSES AFTER LONG DURATION, AND WHICH AGGRAVATE RELAPSES AT SHORT INTERVAL.

The influence which good food and sound health has upon the development of malaria in those exposed to malarial infection is remarkable. This is well seen in the case of masters and labourers; for in the case of the former, owing no doubt to better food and environment, relapses and even primary infections are much fewer than in the case of the badly fed and badly housed labourers. It is not altogether the food, however, that plays a part, for in the time of harvest, when the labourer is fairly well fed, relapses are more common amongst the labouring classes than amongst the masters. This no doubt is due to the extra work and consequent fatigue which follows, and to the fact that gastro-intestinal ailments are apt to develop owing to the extra eating and the drinking of wine which the labourer during harvest work partakes of.

Gastro-intestinal troubles are no doubt accountable in many instances for the reappearance of the attack of fever, for it invariably follows that after any rural feast such as takes place in connection with religious ceremonies, weddings, and at the end of harvest, a sudden accession of relapses occurs.

This is also noticed in mountainous, non-malarious districts, and I noticed in a small mountain village a relapse occurring in three young fellows, who about two days before had been at a rural ball and at the subsequent festivities. No other cause could be ascribed for the relapse, yet in one seven months after, and in the other two ten months after primary fever, relapses occurred; it is also worthy of note that these were the only persons in this village who had taken part in the festivities.

It is admitted that after periods of great fatigue

relapses are common.

Traumatism would also appear to exercise a determining influence on recurrences of fever. I can recall the case of a patient in my ward who had been ill for several months with cardiac trouble, falling out of bed, and after forty-eight hours developing fever of the quartan type, a type of the disease from which he had previously suffered. In patients, coming from the country to a city hospital, suffering from traumatic ailments, it is quite usual to find that they develop malarial febrile attacks after two or three days in hospital.

Sudden chills and damp would also appear to play a distinct part in causing relapses. Labourers who sleep out of doors or in exposed huts are apt to wake up in the early morning with a feeling of chill, which is but too often followed by an attack of fever. When a group of labourers are caught in the rain I have frequently noticed that after one or two days those who have had malaria previously are very likely to develop a relapse.

That excessive heat definitely influences the occurrence of relapses I would not venture to say. On the contrary, it is well to observe that, during the three periods of excessive fatigue for the labourers, namely, at the harvest of the grain, of the Turkish corn, and of the olives, under the same conditions of nourishment and fatigue, I found the relapses equally numerous, and in the same proportion, although these three periods fall the first in summer. the second in autumn, and the third in the depth of winter. Labourers who contracted fever whilst working in the plains in the summer and recovered, have on returning to their mountains had relapses in the autumn. Their belief that the mountain air is the cause of the relapse is such that they are ready to leave their homes again, and to go to the plains for the vintage or to sow corn.

One person had caught a tertian spring infection in the summer of 1899, and had numerous relapses in the winter, staying in Amatrice, a mountainous nonmalarial place; and this was repeated every time that he went hunting, during which time he spent many hours in the snow often without food. It is quite enough to pass from a warmer to a colder region or the reverse, for the relapse to develop, in fact this is so well known that the labourers believe that the

mountain air produces the fever.

Certain foods and medicines are by some stated to favour relapses. This in all probability is due to the gastro-intestinal troubles set up by these substances and not to any specific feature of either the food or medicine. In one case a relapse occurred every time the patient ate fruit, more especially peaches. On careful enquiry, however, it was apparent that the febrile attacks were in every instance attended by vomiting and purging. Another patient got a relapse of fever every time he took iodide of potassium; he took the drug for general arterial sclerosis from which he suffered, but with every administration attacks of tertian fever developed and continued in spite of quinine. In this case also the relapses were associated with gastro-intestinal troubles which were set up by even minimum quantities of the drug.

To intercurrent illnesses are ascribed an influence in the shortening of the period of latency; and it is a question whether the diseases themselves favour fresh relapses or whether they are produced by remedies such as bathing, wet-packs, &c., which form part of the treatment in typhoid fever, &c.

One peculiar feature about relapses in malaria is that they occur in spite of prophylactic treatment by quinine, or by quinine combined with iron and arsenic. At the same time it must be admitted that the period of fever is shorter, the attacks more irregular, and the temperature less high. In fact my observations agree with that of many others, namely, that however potent quinine, &c., is in preventing primary infections, and in the treatment of fever after a primary attack it would seem to have but little influence in chronic malaria. With this conclusion Koch does not agree, for he is of opinion that quinine and methylene blue are valuable prophylactic remedies in all stages of malarial infection. It would appear that neither age nor sex have pronounced determining influences in malarial relapses. Amongst the very old and the very young the attacks of fever may be fewer from the fact that they are less exposed to such conditions as are calculated to induce malaria, such as cold, fatigue, exposure to great heat whilst at work, &c. In malarial districts, however, where whole families reside, Koch maintains that the children suffer most, and that in their blood the greatest number of parasites will be found, and if careful observations of temperature, &c., are made, that relapses are more common amongst them than amongst any other section of the community.

(To be continued.)

## NOTE ON THE INDIANS IN THE CAQUETA TERRITORY, COLOMBIA.

By Montague D. Eder, B.Sc.Lond., M.R.C.S., L.R.C.P.Lond.

The accompanying photographs were taken in a recent trip to this unexplored region. After crossing the Eastern Andes from Colombia the following rivers were visited: the Orteguasa, Caqueta known in its explored course below the falls as the Jupura, Caquan, and some of their affluents. The tribes inhabiting this district are:—

(1) Tamas, on the left bank of the Orteguasa. There are now about forty persons; two years ago nearly eighty died of the small-pox.

(2) Coreguajes, on the right bank of the Caqueta; counts some 300 in all. The language differs from Tama, but ornamentation and habits very similar. Both these tribelets live in fear of, and cannot be induced to go down the river to, the Uitote.

(3) Uitotes, who inhabit both banks of the Caqueta at its junction with the Caquan and spread up into some of the near tributaries. The estimate I was given of 20,000, is probably erroneous and made to include a number of distinct tribes. Along the river Yari offshoots of this tribe practise cannabalism. The Uitotes are fierce fighters, a decidedly handsome race and less morose than the other tribes. A few of the men wear the "cusma," a chemise-like garment, but all the women and most of the men go naked and unashamed.

All these tribes (men and women) eradicate the hair from the body saving their chevelure; eyebrows, eyelashes, hair from the face, axillæ, genitals, all is The reason given me by one hairless pulled out. genius was they could see the fish in the water more quickly; obviously a very insufficient reason. The Tamas and Coreguajes (which tribelets I had most opportunity for observing) are nearly all disfigured by blue carate (pinta disease). Though not soap users they bathe at frequent intervals throughout the day; babies of two months or so are ducked in the rivers by their mothers and howl thereat like any highly civilised babe of the same age. Caries of the teeth is very prevalent in these two tribes; they blacken their teeth with some juice, but I cannot say whether this is the cause of the decay. Phthisis and pneumonia not infrequent; small-pox epidemic and very fatal; syphilis apparently unknown, but gonorrhœa occurs.

Malaria exists in the region, but I think these Indians are really immune; no signs of cachexia were noticed in young or old. Among the few half-breed whites one encounters, the Indians enjoy a great reputation for a knowledge of medicinal herbs. It may have been that professional jealousy would not allow them to impart their secrets to me, but I think the doctor cures on modified Christian-science methods. These same "whites" were not loth to be cured by my quinine, calomel, &c. The food is chiefly farinha and cassava from the wild yuca, plus the products of fishing and hunting; monkey is a much esteemed meat. For about six months in the year the tribe has a common dwelling-house; in the summer, when the rivers dry and sandbanks appear, small huts are erected on these banks; each hut inhabited by a separate family. "In the spring a young man's fancy lightly turns to thoughts of love." I was told that it is only at this summer season that the sexes cohabit. Monogamy is the rule and the husband is very solicitous for the well-being of wife and children. The photographs show:

(1) Tama Indians, male and female; note carate on both faces, woman's hands and the man's legs.

(2) Coreguaje, epaulettes made from palm leaves; the chest lace is of seeds and various aromatic woods.

(3) Coreguaje, note wood through nasal septum; ear doubly pierced for arrow and triangular earring from a battered silver dollar.

(4) Uitote boy, good looking. This boy had been brought by a trader, a gift from the parents; he was going to the interior of Colombia as "general" to some merchant.

It may interest anthropologists to note in the photographs that there is nothing very Mongolian about the features. As regards language and general anthropometric data, a whole continent separates the Red Indian from the Yellow race. I believe it is now generally agreed that the American Indian is of a race apart and not a Chinese offshoot, the easy and earlier view.

### NEW GROWTHS IN TROPICAL COUNTRIES.

By A. B. DALGETTY, C.M., M.D.

Adampore, South Sylhet, India. THE geographical distribution of disease, and the question of a probable antagonism between different diseases are subjects of much interest and importance, but they are matters in which great care must be exercised with the premises in order to arrive at correct conclusions. There is an opinion prevailing that neoplasms are comparatively uncommon amongst the inhabitants of tropical countries, and it has even been suggested that the presence of malaria is responsible for this supposed immunity. The matter is very complex, owing to the great number of questions to be considered, and the data, so far, are meagre and inexact. Hence it is that I venture to send you this small contribution to a great subject, with the hope that it may help to forward a knowledge of the matter.

In India, religious and caste prejudices greatly



Fig. 1.



Fig. 2.



Fig. 3.

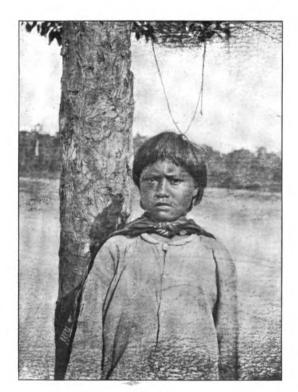


Fig. 4.

To illustrate Dr. Eder's paper—"Note on the Indians in the Caqueta Territory, Colombia." (See page 122).

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hinder advances in medicine generally, and not less in this subject of new growths in particular, because the females of the community are hardly allowed to be seen, and it is specially amongst them that one would look for neoplasms.

However, after one's reputation has become established, it is surprising the amount of confidence which the natives will place in him, and the amount of professional freedom which he is allowed to exercise, in spite of the caste prejudices and religious supersti-

tions of the people.

During the past five years I have had close acquaintance with a labouring population numbering about 12,000, comprising men, women and children, who are imported from other parts of India to work in the tea gardens; and during the same time I have come in contact with a great many of the permanent residents of the district who have come to me from time to time with various illnesses. These were drawn from a population numbering at least another 15,000, so that in these circumstances one should have gained an experience at least approximately accurate of the different kinds and relative frequency of the endemic diseases.

The imported coolies are all Hindus, the resident population mostly Mussulmans, born and bred in the

district for many generations.

During the same period I have had under my care thirty-seven Europeans consisting mostly of men from 25 to 40 years of age, but including also five women and two children. The following table gives the result of my experience of new growths, innocent and malignant, during these five years.

The division into Hindu and Mussulman serves both to distinguish the races and to separate the list of imported coolies, concerning whom my knowledge is much more accurate, from the residents of the district concerning whom my knowledge is less

accurate.

MALIGNANT TUMOURS.

0.	Race.	Sex	Age	Growth	Site
1 2	European	F. M.	47 35	Cancer	Breast.
3		M. M. M.	45 35 30	,, ,,	Tongue Lip Gum and cheek Glans penis.
5 7 8	Hindu	F. F. M.	40 40 35	Sarcoma	Os uteri Palmar fascia.
,	(	M. M. M.	35 50 35	Cancer	Rib.
2	Mussulman -	M.	30		ar- Eye.

#### NON-MALIGNANT TUMOURS.

13	1	F.	40	Ovarian cyst	 -
14	Hindu	F.	30		
14 15	Hindu	F.	35	Fibroid	 Intra-uterine.
16		F.	25	Lipoma	 Breast.
17	Mussulman	F.			 Extra uterine.

<sup>\*</sup> The ages of the natives are only approximately correct.

Several other cases of suspected malignant disease of the intestinal tract have been seen, but owing to the difficulty of getting post-mortem examinations the diagnosis remained unverified. The European case had lived for twenty-five years in India, mostly in this district. The breast, axillary glands, and a large part of the pectoral muscle were removed by Professor Ogston, of Aberdeen, and at this date, four years after, there has been no recurrence.

The figures given for the Hindu population represent fairly accurately, I think, the actual state of matters as regards new growths amongst them, with this exception, that I suspect there are some cases of uterine disease which are hidden. These figures show only eight cases of malignant disease within a period of five years in a population of 12,000 of all ages.

The sites of growth given above cover the most part of the field usually occupied by the malignant neoplasms, with one notable exception, namely, the

female breast.

It is a remarkable thing, but it is a fact that I have not yet seen a case of malignant disease of the mamma in a native of this country. Why this should be is a mystery. It can hardly be simply that I have been unfortunate in this respect, for cancer of the breast would be difficult to hide in the open dress of the native, and other diseases of that part incident on lactation, want of cleanliness and the like are frequently seen.

One or two points in the habits of the natives of India contrast sharply with those of Western races. In the first place there is dress. A woman's dress consists simply of a cotton cloth passed round the body and pulled up over the head and shoulders so that no pressure is exerted on the breasts, which

hang loosely and freely.

In the second place, there is the custom of oiling the body. The oil used here is chiefly from the cocoa-nut and every man and woman, even the poorest, tries to get a little of this substance, which

seems to be a necessity of life.

It is rubbed into the hair and all over the body and appears to check too rapid evaporation, to protect the skin from over drying and blistering from the sun and to cause the rain to run off as from the feathers of a duck. It may be mentioned incidentally, that ringworm of the scalp is extremely rare here, although ringworm of the body is very common and it is just possible that this free oiling of the hair has something to do with its prevention. The oil sticks for a much longer time amidst the hair than on the surface of the body.

In the third place, mothers suckle their children much longer than is the custom in the West. They cannot afford to buy much milk and the same reason saves them from the deluge of artificial preparations which flood the markets at home; besides, the mothers do not look upon the nursing of their own children as a hardship and an unjust task of Nature to be avoided if possible and certainly to be curtailed to the barest necessity. Much the reverse; the mother is the slave of the child and willingly yields her utmost service. The child comes backwards and forwards to the breast long after it is able to speak and run about. This continues for a year, fifteen months, eighteen

months or even longer, so that the lately formed cells of the gland undergo a gradual and complete devolution instead of their function being suddenly checked while they are still in full activity. The breast is literally sucked dry. Such a gland would appear less liable to undergo perverted action than a gland arrested while its function is still in full force.

To digress again for a moment, may it not be that this prolonged suckling accounts in some measure for the excellence of the teeth in the mouths of the less

civilised races.

Of course, the three points mentioned above, if they have any influence at all, can only be factors contributory towards the repression of the causes supposed to favour cancer, the true cause being, as we must regard

it to be, a living organism.

Again, it may be said that Eastern races die at an age when cancerous growths are less common. But age is a relative term. In the tropics the succeeding stages of life follow one another quickly. There is properly hardly any period of youth. Children shoot up from childhood into manhood almost at a step. Amongst the Hindus, marriage is arranged for the children while they are still mere infants and when sexual maturity arrives they begin life together, hence by the time they are twenty years of age they are the parents of a considerable family. Old age, therefore, comes quickly, especially to the labouring classes; a man is old at thirty and not fit for much at forty-five, if he survives till then. Thus the Western cancer-age is hardly reached although one should expect that it would be merely anticipated by ten or fifteen years if the disease were as common in the East as it is in the West.

Another matter worthy of mention is the absence of ordinary warts. I do not remember ever having seen a wart, a thing which is so common amongst people at home, on the hands or any other part of the body, either of a child or an adult in this country. Why

this should be is difficult to say.

Granting for the sake of argument that new-growths are less common amongst less civilised races, has the presence of malaria anything to do with it? tropical countries malaria is ubiquitous and everyone suffers from it more or less at some period of life. It is safe to say that everyone of the cases in the list given above had suffered from malaria, so that the two diseases are not absolutely antagonistic at any rate. If one could find a region where malaria was abundant and cancerous diseases almost unknown and a contiguous region where the state of things was exactly the reverse, something might be said for a possible antagonism; but such a contrast would be very difficult to find. Or again, in an individual suffering from undoubted cancer, if the onset of a severe malarial fever led at once to a marked diminution of the growth there would be good grounds for connecting the two as cause and effect, but I have seen no case of the kind.

However, the subject is a new one and time will be required to collect data.

BLACKWATER FEVER .- M. Otto reports a case of blackwater fever occurring in quartan malaria as illustrative of the theory that quinine is the causative factor of hæmoglobinuria in malaria. In this case the blood pigment first made its appearance after the exhibition of 75 grains of quinine. The patient had been suffering from malaria for some weeks, but quinine had not been previously taken except in one of two very small doses. The hæmoglobinuria was very pronounced, but no more quinine being given, In a few days quinine was again soon subsided. administered, and was promptly followed by the presence of blood pigment in the urine, but this second attack was not as severe as the first. The administration of the drug was then carried on by the rectum and was not followed by hæmoglobinuria; it is probable that this was due to the small amount thus absorbed. Later renewed attempts were made to give quinine by the stomach, but whenever any considerable amount was taken hæmoglobinuria promptly occurred. The vast majority of the cases of blackwater fever hitherto observed have occurred in tropical countries, and in connection with the pernicious form The fact that this case developed in Germany, in a patient who had never been outside the limits of the country, and was plainly brought on by the administration of large doses of quinine, lends strength to the theory that this disease results from the action of quinine upon the blood of certain malarial patients. — Deutsche Medicinische Wochenschrift, January 23rd, 1902.

A NEW FACTOR IN THE ETIOLOGY OF MALARIAL FEVER, INDICATING NEW METHODS OF TREATMENT .-A. F. A. King adduces arguments to prove that heat is not a factor in the etiology of malarial disease, but explains the undeniable relation between hot climates and malarial fever by eliminating the term "heat" and substituting that of "light." Paroxysms of intermittent fever will not, as a rule, take place at night, in the dark. In places where malarial fever prevails, the disease is increased by bright, sunny weather, and lessened by clouded skies. It has long been a tradition that to prevent the occurrence or recurrence of ague it is advisable to keep in the shade and avoid sunlight. The malarial parasite is a naked amœba. Red light promotes the vital activities of amœbæ, while violet or purple light restricts them. The colour of the light diffused through the blood is necessarily red. The relative liability and immunity of different races of men to malarial fever depend upon the relative translucency or non-translucency of their skin, and probably of their blood. If the etiology given be correct, correct treatment will consist in keeping patients in the dark, or in rooms with purple or indigo windows, and clothing them in garments impenetrable to light; in the tropics, white clothing, lined with purple or black. Drugs that darken the blood, or render it violet, or lessen its translucency, should be given. Quinine sulphate in solution intensifies the violet, and even renders the ultra-violet rays of the spectrum perceptible to human vision. American Journal of Medical Science, February 10th, 1902.

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THE

## Journal of Tropical Medicine

APRIL 15, 1902.

### NEW GROWTHS IN TROPICAL COUNTRIES.

Dr. Dalgetty's paper in the present issue of the Journal is opportune. It moreover conveys a considerable amount of useful information, and, at the same time, introduces a number of original ideas well worthy of discussion and close attention.

The relation of malaria to cancer, so widely published at the present moment, must cause every practitioner in the tropics to think over his experiences, and to collate for publication or for his own knowledge, the results of his observations. Many will no doubt deride the idea, and others may uphold the relationship of the two diseases; but all would do well to be warned by Dr. Dalgetty's remarks, that the information is not so easily obtainable as would at first sight appear. We know how many women in Britain seek to conceal the fact from their friends and from their doctors that they have any growth in the mamma.

We have even heard it said that should a woman come to consult a surgeon at an early period of the growth of a mammary tumour, it affords a presumption that the disease is not malignant. It would seem to be a feature of the constitutional or mental condition of women suffering from malignant growths that they wish to conceal their ailment. An explanation of this is difficult to find, except it be the dread of having the suspicion confirmed, or of the surgical proceedings which may be recommended. In tropical countries there are several other reasons; there is the dread of the foreign doctor, the seclusion in which women naturally live, the reticence to bring any feminine ailment within the ken of the male, and the horror with which native women regard operations; medical men therefore collecting statistics concerning diseases of natives, more especially of the nature of new growths, have to exercise the greatest care that they are not misled. often has it happened that, after years of residence in any locality, certain types of disease seem to be non-existent until some chance circumstance brings one case forwards. Should this be of the nature of a tumour, and if the surgeon is fortunately able to successfully remove the growth, many more cases will immediately come forward for treatment. Take such an ailment as ovarian tumour. The writer has previously related his experiences in this direction: how for four years no case of ovarian tumour was seen by him amongst native Chinese women, and yet, after a successful operation on one patient, a large number of women, suffering from ovarian tumours, immediately came forward for treatment. cholera or plague is reported in a native city, a doctor sent thither always finds considerable difficulty in getting to know of any cases, and establishing the fact that the report is true. Cholera and plague cases are carefully hidden when an inspection is being made, but once a few cases are found, and the natives see that the patients are kindly treated, the inspecting officer may suddenly find himself in the midst of a severe epidemic. If this is the case with an epidemic disease, how much more likely are cases of malignant disease capable of being concealed?

Lactation and Cancer.—Dr. Dalgetty's remarks on the period of lactation in women and on the emptying of the mammary gland are well worthy of study. The native women suckle their children until the gland "runs dry," and Dr. Dalgetty not inaptly ascribes the absence of mammary cancer to this circumstance. The pernicious doctrine—taught chiefly by the monthly nurses who attend upon "fashionable" women in Britain—that the child should be reared by hand, and that the mother is "not strong enough" to bring up her child at the breast, is at the root of many of the troubles of both women and their Measures, abnormal measures, are taken to check the flow of milk, and the normal physiological function of the gland is arrested by abnormal means. That unhealthy processes must ensue would seem physiologically certain, and it may be that we have here one explanation of the frequent presence of mammary cancer amongst the women of Western Europe compared with the same disease amongst natives of the tropics. We are aware, of course, that barren women are attacked by mammary cancer, but in them it is usually at a much later period of life.

Dr. Dalgetty's remarks on the teeth of native children are also worthy of note. Decayed teeth in young people of the tropics is quite the exception; until the age at which tobacco is used, or some one of the baneful customs, such as teethstaining, betel chewing, &c., are in vogue, carious teeth are seldom seen. Another point connected with early weaning from the breast is the fact that the mother becomes again pregnant soon after the birth of a child. As long as lactation continues she is not so likely to become pregnant, and the intervals between her children are therefore two or three years as a minimum. In the countries of "higher" civilisation, in which the period of suckling is curtailed, the mother may become pregnant within a few months of parturition, and it may happen that five or six children are born in as many years. That this can be good for either mother or children is unlikely, and with it the modern plan of "prevention" came into vogue. The matter resolves itself into a simple problem: Allow the natural period of lactation to

continue and the intervals between the birth of children will be two or three years; curtail it by artificial means and either one of two things will happen: the mother will have her children too quickly or she will resort to artificial means to lessen the number of her offspring. The lesson for medical men is clear, namely, to encourage the mother to bring up her children by the breast for at least nine months, and to set their faces against the nurses who, pandering to the wishes of their employers, recommend the pernicious and unhealthy doctrine that the child is best reared by "the bottle."

J. C.

## MEDICAL SOCIETY. MADRAS BRANCH, B.M.A.

The following interesting and valuable discussion is published in extenso:—

Discussion on the Treatment of Hepatic Abscess.

LIEUTENANT-COLONEL J. MAITLAND, I.M.S.: The subject that we have met to discuss this evening is not only one of perennial interest to us in Madras, where the disease is so common, but is also one of special interest at the present time, owing to the fact that somewhat radical changes in the treatment of this affection have lately been forced upon the attention of the profession. The first point to which I should like to draw attention concerns the use of the exploratory needle. There is a tendency amongst medical men of the present age to resort somewhat hastily to the use of such means as that of the exploratory needle, to the neglect of careful and systematic investigation by the more ordinary and often less hazardous methods of clinical examination-a tendency, in other words, to make short cuts to diagnosis. I am afraid that this is sometimes the case in regard to abscess of the liver. In the great majority of cases the diagnosis of hepatic abscess is quite simple, and the use of the exploratory needle quite unnecessary. It is extremely important to emphasise this point because there appears to be a widespread idea that the use of the exploratory needle, in cases of disease of the liver, is a very simple procedure, and one unattended with any danger. So far is this from being the case, that a very considerable number of deaths have been recorded, as having been due directly to this operation. For this reason alone it is important to insist that exploratory punctures for the purpose of diagnosis in cases of disease of the liver should be restricted to those cases in which it is absolutely necessary. There are a certain number of cases in which its use cannot be avoided, but they form a comparatively small proportion. What are the causes of the hæmorrhage which occurs in some of these cases? Mr. Cantlie, in a paper read at the recent meeting of the British Medical Association, stated his belief that the chief danger of hæmorrhage was from the inferior vena cava, and that this vessel could not be injured so long as the needle was not thrust in as far as four inches. Whether any of the recorded cases of hæmorrhage were due to injury of the vena cava or not, I am not prepared to say, but I do know from practical experience that fatal hæmorrhage may occur from puncture of the liver tissue alone, when that tissue is in a condition of acute congestion. I speak feelingly on this subject because I lost a patient myself

from this cause. The case was one in which I was asked to explore the liver of a patient who was suffering from acute hepatic congestion, and in which the presence of an abscess was suspected. Two hours later, when going round the wards, I found the patient dying from internal hæmorrhage. The vena cava was not injured in this case; bleeding took place from the liver substance itself. Fatal hæmorrhage has also been known to occur from injury to the intercostal Whenever it becomes necessary to perform an exploratory operation, arrangements should be made to open the abscess at once, should pus be discovered. By opening the abscess at once, not only is the patient saved the injurious consequences that may result from delay, but he is also saved the anxiety involved in a second operation. Moreover it sometimes happens that considerable difficulty is experienced in hitting off the abscess at the second operation, although it may have been found quite easily on the first occasion. Indeed I have known of a case, in the practice of a colleague, in which the abscess could not be found at all at the second operation. In performing the exploratory operation by means of a needle there is one precaution to which it is important to pay attention. There is always a temptation, in withdrawing the needle, when no pus has been found, to alter its direction before it has been completely withdrawn, and make another exploratory venture through the same orifice. As this manœuvre tends to enlarge the orifice of entrance, it should always be avoided. If it is necessary to explore again, a fresh puncture should be made at another point. The fatelity to which I have already alluded was due, I believe, in part, to neglect of this precaution. The possibility of wounding the inter-costal artery, if due precaution is not taken, must also be borne in mind.

I will now pass to the consideration of the operation for the evacuation of the abscess. If no exploratory puncture has previously been made, a needle must first be inserted for the purpose of locating the pus. In the great majority of cases of single abscess the pus is found in the right lobe, and a trans-thoracic opening is required for its evacuation. The cases in which the abscess is situated in the lower part of the right lobe, which has been pushed far down below the margin of the ribs, are, in my experience, comparatively uncommon. I propose, therefore, to first describe the trans-thoracic operation, as I am in the habit of performing it. If any point of special tenderness has been found, the needle may be thrust in at that part. If no indication of that nature is present, it is best to explore through the eighth intercostal space. When the abscess has been found the needle should be left in situ, to serve as a guide. incision is then made over the rib immediately beneath the level of the needle, and a portion of the bone, about two inches in length, is removed. The pleura is next incised, and, if there are no adhesions, the two layers are stitched together, the sutures being made to enclose as wide an area as possible. The diaphragm and peritoneum are next divided, and if no adhesions are present, the peritoneum is dealt with in the same manner as the pleura. A pair of sinus forceps is passed alongside of the aspirator needle into the abscess and an opening made by separating the blades. The opening is then enlarged to the necessary extent by incision. Having made a sufficiently large opening, two glass drainage tubes are inserted and the pus allowed to flow away. When pus has ceased to flow freely allowed to flow away. When pus has ceased to flow freely the cavity is irrigated with weak boric acid lotion or sterilised water, in order to wash away as much as possible of the remaining purulent contents. Irrigation of the abscess cavity, although not an absolute essential, has the advantage of minimising the amount of discharge subsequent to operation. After the abscess has been emptied as far as possible, a finger is introduced into the cavity for the purpose of ascertaining its size, and necessity, or otherwise, of making a counter-opening. If the abscess is a large one, and the opening has not been made at the most dependent point, a counter-opening should be made further down and more

posteriorly. The arrangements for securing free drainage are the most important points in the whole operation, and it is for this reason chiefly, as I shall show later on, that I am opposed to the methods recommended by Mr. Cantlie, in the paper alluded to above. The main opening into the abscess should be sufficiently large to admit two drainage tubes of half an inch diameter easily. An opening of this size cannot be made in the chest wall without removing a piece of rib. I am in the habit usually of injecting iodoform emulsion into the cavity of the abscess, before inserting the drainage tubes. This is done with the view of checking septic decomposition should the discharges come to the surface and become contaminated, as they are not unlikely to do if the abscess has been a large one. There is considerable difficulty in applying a sufficiently wide and thick dressing to this part of the body. In a climate like that of this country, nothing is more distressing to a patient than to be swathed in an enormous mass of dressings.

When the abscess has to be opened below the ribs the operation is necessarily more simple. Here again I consider it best to operate by means of a free incision, and, if adhesions have not taken place, to stitch together the two peritoneal surfaces. If, as sometimes happens, difficulty is experienced in suturing the peritoneum, owing to the proximity of the pus to the surface, or to the movements of the liver, the better plan is to pack the wound with gauze, and, having turned the patient on his side, to open the abscess by means of a knife. After the pus has been evacuated, the edges of the wound in the liver are stitched to the edges of

the wound in the abdominal wall.

I should now like to say a few words regarding the method of operation recommended originally by Dr. Manson and specially advocated by Mr. Cantlie at the recent meeting of the British Medical Association. It is necessary that this question should be fully discussed, not only because this method is so enthusiastically recommended by Mr. Cantlie, but also because he condemns, in equally forcible language, all other methods of operation. Is it possible that our methods here in India are so faulty as he proclaims them to be? For my own part I do not think so. Mr. Cantlie's method, speaking briefly, consists in puncturing the abscess with a trochar and emptying it by means of "syphon drainage." It is in fact an operation by means of limited incision as opposed to operation by free incision, and is therefore opposed to the ordinary principles upon which abscesses in other parts of the body are treated. main objection to this operation, as I have already stated, is that by such a method of dealing with an abscess of the liver we cannot ensure that drainage will be sufficiently free. This objection is forcibly illustrated by three out of the four cases cited by Mr. Cantlie in his paper. In the first case we are told that on the tenth day the drainage tube having slipped out, it was found necessary to administer an anæsthetic before the tube could be re-inserted. Again, in the same case, on the thirty-fifth day, it became necessary to make a counter-opening in order to establish free drainage. In the second case we find that on the thirty-third day there was some difficulty in drainage, and it was contemplated to open the cavity further back, but the patient objected to be operated upon again. In the third case the drainage tube was pulled out by the patient on the night after the operation and "could not be satisfactorily replaced." later a large drainage tube was introduced and twenty ounces of pus welled out of the wound. It is to be presumed that these four cases that have been selected by Mr. Cantlie, are taken by him to illustrate the benefits of his method of treating abscess of the liver, as compared with the results obtained by other methods. If that be so, I can only say that in my experience such extraordinary difficulties in securing free drainage as were met with in these three cases are the rarest exception. It is impossible to avoid the conclusion that all these difficulties would have been obviated had the abscesses been opened by free incisions. The truth of the matter is that an opening so small as to

tightly embrace a single tube does not suffice for the efficient drainage of most large abscesses of the liver. Moreover, if the tube becomes displaced by accident, its replacement into so small an opening is almost an impossibility. These difficulties are occasionally met with even in cases where a piece of rib has been excised and an opening made sufficiently large to admit two drainage tubes with ease. Another disadvantage of Mr. Cantlie's method of operation is that it does not admit of exploration of the cavity of the abscess with the finger, and therefore no estimate can be formed of its size, nor of the necessity, or otherwise, of making a counter-opening.

Before concluding I would like to draw attention briefly to the objections raised by Mr. Cantlie against the ordinary method of operation. In the first place, he states, that "the severity of the operation in many cases is such that the opening of the abscess is apt to be deferred until too late in the disease." That is a statement that is entirely without justification so far as India is concerned. The rule in this country is to operate at once. His second objection is that "the medical practitioner is willing to try every available resource before condemning his patient to so severe a line of treatment." It is hardly necessary for me to say, in this assembly, that such a statement is also without justification, at least so far as India is concerned. Indeed it would be curious to know what the "available resources" are, to which Mr. Cantlie alludes.

LIEUTENANT-COLONEL STURMER, I.M.S.: I agree with what Colonel Maitland has said for the most part. My experience is no doubt limited and I have not had to excise the rib so frequently, but then perhaps my cases have been further advanced and have contracted adhesions to the abdominal wall below the ribs. I cannot consider Mr. Cantlie's operation superior to that of incision and free drainage. My results from prospecting the liver have never resulted in any after bad effects, but Colonel Maitland states he lost a case, and Colonel Hatch, in the Indian Medical Gazette, reports one or two deaths. That the liver can bleed when punctured there can be no doubt, and that too, without puncturing any such large vessel as the vena cava. I certainly think it advisable to irrigate the abscess cavity after incision, and cannot understand why you should treat a case of hepatic abscess differently to that of an abscess elsewhere.

Captain Molesworth said he should like to ask Colonel Maitland whether it was not a fact that exploration in cases of congestion of the liver has not been followed by disappearance of the symptoms.

LIEUTENANT-COLONEL BROWNE agreed with Colonel Maitland's remarks. He did not quite understand what Mr. Cantlie meant by "syphon drainage," and noticed that Dr. Manson said nothing about it in his latest book. It was very unusual for the tube to run "full," and therefore "syphon action" could not be obtained. He believed that the danger of damaging the pleura was just as great with the tube as with the incision method. He knew of three cases in which death occurred from hæmorrhage. In one of these, certainly, the bleeding did not come from the vena cava or any of the large veins, but welled up from the whole of the interior of the wound.

Captain Niblock said that he agreed with everything Colonel Maitland had said. As to exploratory puncture with a needle he thought it should only be done in the operating theatre, when the operation could be proceeded with at once. Two cases he had seen impressed this strongly on his mind. The first case had been explored in the ward, and was a short time afterwards sent to the theatre. When the liver had been exposed by incision the pus was seen to be pouring into the peritoneal cavity through the puncture in the hepatic wall. In the second case also the patient had been punctured and then sent to the operating theatre with diagnosis of hepatic abscess. Under chloroform an exploring needle was introduced close to the former puncture wound, but immediately on entering

the cavity of the peritoneum blood began to flow through the needle and several ounces came away. An incision was made alongside the needle at once, when about ten ounces of dark blood were sponged out of the peritoneal cavity. The liver was found to be very congested and the capsule extremely tense. An irregular rupture about three-quarters of an inch in length was found in the latter, which opened immediately into a cavity the size of a walnut. In this case the oozing was general and did not come from any large vein. The damage to the liver substance was probably due to alterations made in the direction of the needle before it had been completely withdrawn. His experience therefore agreed with that of the previous speakers that bleeding was not in every case, at any rate, due to puncture of a large vein.

The operation performed by him was similar to that described by Colonel J. Maitland, except that he did not inject iodoform emulsion. Later, if any unpleasant smell was noticed in the discharge, he injected iodoform emulsion. He believed firmly in the use of two large tubes, one of which could be removed after a few days' time in the majority of cases. In one of his earliest cases in which the liver only projected a few inches below the costal margin he incised below the ribs, with the result that as the abscess began to empty and contract, the liver was drawn up under the ribs and the utmost difficulty was experienced in getting, and keeping, the drainage tubes in. Ever since, unless there was very great enlargement below the costal margin; he used the trans-thoracic method, generally with excision of a rib.

He had operated by the incision method in twelve cases of single abscess, with two deaths, and in four cases of multiple abscess, all of whom died. In no case was death due to the operation itself, and he did not think that any of the fatal cases would have been saved by the "syphon drainage" method.

LIEUTENANT-COLONEL J. MAITLAND in reply: Captain Molesworth has drawn attention to the fact that it is stated in some books that puncture of the liver with an exploring needle, even if no pus is found, is calculated to have a beneficial effect. It is unfortunately true that such has been the teaching on this subject, but it is to be hoped that, in view of the fatalities that have resulted from the operation, the use of the needle will in future be more restricted than in the past. He was pleased to learn that evidently all the members present were in favour of the open method. As to mortality after operation, the great majority of our deaths were in cases of multiple abscesses of the liver.—The Indian Medical Gazette.

## Hew Drugs, &c.

#### SINARO WATER.

A TABLE WATER.

The market is so flooded with mineral waters of various kinds that it seems waste of space to discuss another. After a practical test, however, of Sinaro, we have departed from our plan of ignoring such waters and the flaming advertisements of their promoters. Sinaro is not only a pleasant water for table purposes, but we can positively assert its efficacy in kidney complaints of the nature of gravel. The composition of the water no doubt helps to explain its efficacy in complaints of the kind, but practice is worth any amount of theory, and the practical value of Sinaro we are prepared to stand by.

As a test of the usefulness of this natural spring

water in the tropics, we are informed that Sinaro is largely exported to South Africa, Australia, Sumatra, &c.

Analysis of Professor	Fres	enius.	Wiesbaden.
Bicarbonite of soda			0.641067
" ,, calcin			1.207257
", ", magn			0.430060
			0.097792
Sulphate of potash			0.008334
Chloride of potash			0.009706
" " sodium			0.001275
Silicic acid			0.035201
Free carbonic acid	gas		2.678752

Gr. 5·109444

The springs from which Sinaro is derived are situated at Nastaetten, near Wiesbaden. The proprietors of Sinaro have not as yet advertised the water widely enough to make it generally known, but we would advise them to do so, for they have a capital article to push, and it is their fault if the water does not become popular, for it only wants to be known to supersede many at present in the market.

## Rews and Hotes.

Cholera.—The present pilgrimage to Mecca seems to be attended by a serious outbreak of cholera. Over 1,000 cases are reported to be occurring weekly in Mecca and the port of Jiddah. From Medina also, lying 248 miles to the north of Mecca, over 100 deaths from cholera are reported. Seeing that a large percentage of the Mecca pilgrims go to Medina, the danger of a widespread infection is considerable.

The danger to Egypt from cholera is particularly great. This year a large number of pilgrims have gone from Egypt, and it is to be feared when they return from Arabia that an outbreak of cholera may occur. The Sanitary Department of Egypt is, however, so well regulated, and the authorities are so constantly on the alert, that they may be implicitly trusted to take the necessary steps to guard against the disease gaining a serious hold on the country.

NATIVE REMEDIES. — The British and Colonial Druggist, February 21st and of March 14th, 1902, gives some interesting details of primitive methods of treatment.

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BOER REMEDIES.—A visitor to one of the camps was surprised to see a cat running about one of the tents with all its fur clipped off. He inquired the cause, and was informed that the fur had been cut off and roasted, and then applied to his child's chest as a remedy for bronchitis. On another occasion a doctor discovered that the parents had killed a goat and cut it open, removing the internal organs. They had then put the child inside, with its head protruding through the opening made by removing the breast bone.

A favourite remedy for jaundice is to rub the

patient's body with cabbage seeds. The seeds are then sown. When they come up the jaundice disappears. There is nothing entirely unparalleled in any of these modes of treatment. The idea of the cabbage seeds is not unlike the old English way of curing the whooping cough by interring it, the patient coughing into a hole dug in the soil; or of rubbing warts with a match stick, then burying the match and waiting for a tree to grow and the wart to disappear! A curious cure for toothache is mentioned. The finger- and toe-nails of the sufferer are cut off short. The parings are put into a bottle with a lock of his hair and some water. The bottle is then corked and buried and the toothache disappears.

II.

TONQUIN AND THERAPEUTICS.—Dr. Vialet, a surgeon in the French Navy, has just published some particulars of the stock-in-trade of the native drug dealer of Tonquin. Dr. Vialet tells us that the soil itself is the most popular and infallible of all the "drugs" these regions. Mother Earth is prepared for medicinal purposes as follows: Small mud-pies are made and cut up into small squares; these are flattened out into tablet form and cut into little rectangular pieces. When dried, these pellets are ready for use. The soil chosen is determined by the nature of the disease under treatment; thus, dirt dug up in the vicinity of the doorstep is indicated in cases of abscesses, and useful in painful confinements. Earth freshly scraped up by rats cures paralysis and stops the weeping of children. Thus it must not be thought that the Tonquinese treat all diseases from the same bottle, as it were. One small plot of land may comprise a dispensary complete with fifty different kinds of earth. and the skilled doctor knows just where to dig to find the particular medicine his patient requires.

As in all the old pharmacopæias, the excrements of animals furnish some of the most largely-used remedies. This is the receipt for a cure for small-pox. On the eve of the ninth day of the ninth lunar month a pig, a dog, and a cat are shut up in the same enclosure. For ten days they are fed on rice, and at the end of that period the excrement is collected. This is preserved until the eighth day of the twelfth lunar month-the animals being carefully shut off from the rest of the world during the intervening period-at which date, before sunrise, the matter collected is cooked, and the residue in the crucible is put into a bottle. The maximum dose of this medicament is 15 grains four times a day. Vaccination is, however, beginning to become fashionable, and this concoction will probably soon be obsolete. Although these medicines would appear of a somewhat primeval nature, it must be borne in mind that the medical profession is not open to all and sundry; on the contrary, the regulations governing the practice of therapeutics are very stringent. In Annam, before a doctor can practice, he must have studied the medical art for a period of no less than ten years. Not that the diseases are more numerous than in other countries, nor their diagnosis more difficult, but the names and the nature of the innumerable drugs make a long course of study necessary .- Brit. and Col. Druggist, March 14th, 1902.

## Current Miterature.

DR. HEM CHANDRA has contributed a valuable article entitled "The Therapeutics of Semi-Carpus Anacardium" (Dhobi's Nut), to The Indian Medical Gazette, March, 1902. The conclusions the author arrives at from practical use of the semi-carpus anacardium are as follows:—

"This is a very reliable drug in the treatment of nervous disorders. The precautions of using milk and ghee must not be forgotten. If this drug be used extensively by scientific practitioners, I am sure they will recommend its introduction into the B. P. Many poor people hold a mela once a year. During this ceremony they take its decoction with milk, ghee and honey or sugar. This keeps them free from any dis-During winter consumers of this drug can safely sleep in the open fields without warm clothes. I have been using this drug for more than six years without seeing any bad effect other than erythematous rash. In the Campbell Hospital I have made many bed-ridden cases of disseminated sclerosis walk about in the hospital compound. As an alternative it is very helpful in secondary and tertiary stages of

syphilis."

"I have used it successfully in two cases of epidemic

dropsy of the legs recently.'

## NOTES ON THE PREVALENCE OF FILARIASIS IN THE CALCUTTA POLICE FORCE.

By C. R. M. Green, F.R.C.S.Eng., D.P.H.Camb., Major I.M.S.

Superintendent Campbell Medical School, and Police Surgeon, Calcutta.

During the months of October and November last year, I examined the blood of 100 constables newly admitted into the Police Hospital for all kinds of disease. The blood was taken at 10 p.m., and in most cases only one cover-glass was examined.

Prevalence.—I found filariæ in 7 per cent. of the cases. The number of constables affected with filariasis was, however, probably much greater, for one case was examined on nineteen nights (besides being examined several times by day) and a filaria only found on one night, and in another case filariæ were only found on two out of seven nights, and seeing that, only one specimen of the blood was examined in most cases.

Species and Periodicity.—The filariæ had all the characters of the filaria nocturna, the hæmatozoal embryo of the Filaria Bancrofti, as described by Manson. The covering and uncovering of the head and the shooting out of a spike or fang, as Manson calls it, from the head being easily seen and interesting to watch in dying specimens.

The members of the Expedition to Nigeria consider the F. nocturna and F. diurna to be one and the same species, the prevalence of the later by day being due to the nocturnal habits of certain West African tribes. As bearing on this point, I may say that the Calcutta police constable has a good deal of night duty, and both he and his ancestors always took a midday siesta when they could get it. In fact most natives of India are, to a certain extent, nocturnal in their habits.

In these seven cases I examined the blood by day, but did not find any filaria, e.g., one case was examined on—

October	25th	at	8 a.m.	Result	nil.
,,	27th	,,	noon	,,	nil.
,,			3 p.m.	,,	nil.
,,			4 p.m.	,,	one filaria.
,,			10 p.m.	,,	two filariæ.
	31st		10 p.m.		nine filariæ.

Dr. Manson, in his article on filarial disease in Davidson's "Hygiene and Diseases of Warm Climates," states that, "although when seen alive in the blood, the embryo F. diurna resembles so closely F. nocturna as to be practically indistinguishable therefrom, a singular difference is observable between the species when seen post mortem on dried and stained slides of thickest blood films." This is that the F. nocturna is arranged in graceful curves, while the F. diurna looks shrunken and thickened and has assumed a stiff, rigid, ungraceful attitude. Dr. Manson says, "I consider it a diagnostic mark of value."

In the Police Hospital, I observed dead forms of these filariæ—certainly F. nocturna—in very stiff, ungraceful attitudes, and exactly like those figured by Dr. Manson as belonging to dead F. diurna.

Diseases of the cases in which filariæ were found.— Filariæ were found in two cases of dyspepsia, one of incised wound, in one each of bronchitis, dysentery, bubo and syphilis (tertiary).

Amongst those examined were two cases of lymph scrotum with elephantoid fever, but filariæ were not

Hydrocele and Filoriasis.—The blood in five cases of hydrocele was also examined for filaria with negative results. Hydrocele is a common disease of native constables. That it is prevalent in the districts also from which they come is shown by the fact that out of 631 recruits examined by me in the last six months of 1901, 36.6 per cent. were rejected. Hydrocele was responsible for 27.27 per cent. of the rejections, or more than any other two causes put together. The 631 recruits were affected with hydrocele to the extent of 9.98 per cent.

Geographical Distribution.—There are no grounds for supposing that the filariasis with which these men were affected was contracted in Calcutta; in fact one affected man had only recently been recruited. The districts from which those affected came were the following:

0.1	1	District of	Sultanpur	3	cases.
Oude	1		Gonda		case.
NW. Provinces		,,	Ghazipur	1	,,
Monthoun Bongal	1	,,	Arrah	1	,,
Northern Bengal	1	,,	Gya	1	,,
				-	
			Total	7	

The area of the recruiting ground of the Calcutta Police is fairly shown by the above-named districts. It is desirable that some observations should be made

<sup>&</sup>lt;sup>1</sup> [An examination of over 1,000 Bihar prisoners in Bhagalpore Jail showed an 8 per cent. prevalence of hydrocele.—Ed.

as to the prevalence of filariasis in the inhabitants of Lower Bengal.—The Indian Medical Gazette, March, 1902.

# ON A PROBABLE WAY BY WHICH THE YOUNG ANKYLOSTOMUM DUODENALE ENTERS THE HUMAN SUBJECT.

By Thos. L. Bancroff, M.B.Edin., Deception Bay, Queensland.

The accepted way by which the ankylostoma enter the human body is through the alimentary canal, and cannot be better expressed than in Manson's words: "Should chance so determine, it (i.e., the young ankylostomum) is finally transferred to the human alimentary canal, either in muddy drinking water, or in the mud or dirt adhering to the hands or food dishes of the agriculturist, the brick-maker, or other operative engaged in handling the soil; or, it may be, in earth deliberately eaten by the geophagist." In the British Medical Journal, September 14th, 1901, p. 690, there appeared a paper by Professor Sandwith, of Cairo, entitled "Note on the entrance of ankylostoma embryos into the human body by means of the skin."

This paper should be carefully read by all physicians who are called upon to treat cases of ankylostomiasis.

It appears that Dr. Looss, as far back as 1898, stated that the ankylostoma embryos entered the human body by the skin as well as by the alimentary canal, but his statement met with hostile criticism. Recently, however, whilst working in his laboratory with the larvæ of ankylostomum, he accidently infected himself; the worms entered the skin of his hand and he afterwards suffered from debility and anæmia, and ankylostomum eggs were found in his fæces.

In the Deception Bay district I have had under observation for a number of years two families whose children harbour this parasite; the children have reinfected themselves over and over again in a mysterious manner, but in the light of Dr. Looss's discovery, it would appear that they have done so by means of their feet. They were earth-eaters, but we were never ever able to detect them eating the earth in which the embryos occurred; one child used to eat charcoal, whilst another broke old bricks and picked out certain siliceous pieces, these he pounded, and afterwards swallowed the sand. I am of opinion that persons suffering from ankylostomiasis can bring about a feeling of well-being by swallowing gritty substances; such substances possibly dislodge the parasite from the bowel.

The water they consumed was rain-water, collected from the roofs of the houses and stored in well-constructed tanks; it was pure both at their homes and at the schools they attended.

Neither family used a closet, but each member selected a spot behind bushes, logs, stumps, &c., within a radius of fifty yards from their dwelling; when the spot became foul another one was used, but after rains, when the excreta were disintegrated and

had disappeared from sight, the old locality was again visited, and as all the children went barefooted, it is possible that in treading on the soil containing the young ankylostoma, especially in wet weather, the parasites entered through the delicate skin between the toes.

In addition to the old advice given to sufferers from ankylostoma, viz., "to observe cleanliness, more particularly of the hands, drink only boiled water, and not to eat earth," it would be well to add, "wear boots and use a closet."—The Australasian Medical Gazette, February 20th, 1902.

## SULPHUR IN THE TREATMENT OF DYSENTERY.

By RAM DHARI SINHA, L.T.M.S.

Medical Officer, Imperial Service Lancers, Jodhpur, Rajputana.

DURING the months of November and December, 1901, I had frequent occasions of treating several cases of dysentery, both in my hospital and in private practice.

I tried sulphur sublimate and Dover's powder, as advocated by Dr. Richmond, of the Imperial Yeomanry, Pretoria, and I can now endorse the gratifying results he claims for his method. The powders were given every four or six hours, either swallowed with a draught of water or mixed with honey or butter.

In two of my cases the powders produced vomiting and nausea, even after the omission of Dover's powder. I sometimes substitute pulv. kurchi., grs. xx., instead of Dover's powder.

Remarks.—The sulphur sublimate, mixed with equal quantity of pulv. holarrhena antidysenterica cortex, has produced the same gratifying results as with pulv. ipecac. co., and sometimes, when idiosyncrasy for ipecac. was prominent, better results.—Indian Medical Record, March 5th, 1902.

#### PLAGUE.

#### PREVALENCE OF THE DISEASE.

India.—During the two weeks ending March 8th and 15th, the number of deaths from plague reported in India amounted to 23,715 and 25,655 respectively. The majority of this huge total occurred in the Punjab, where during the two weeks in question there died of plague, respectively, 12,544 and 15,090 persons.

In the other districts and cities of India, the number of deaths from plague, during the weeks ending March 8th and 15th, respectively, were: Bombay city, 888 and 856; Bombay Districts, 4,806 and 4,779; Calcutta, 462 and 501; Bengal, 1,235 and 1,289; The North-West Provinces and Oudh, 2,187 and 2,335; Mysore State, 414 and 304.

In the city of Bombay, during the month of March, 1902, the reported cases of plague numbered 4,325, and the deaths from the disease, 3,656. In the Bombay Districts the chief centres of plague were Kaira with 3,875 cases, 2,503 deaths; Broach, 760 cases, 566 deaths; Surat, 592 cases, 449 deaths; Khandesh, 4,345 cases, 3,418 deaths; Nasik, 228 cases,

<sup>&</sup>quot; Tropical Diseases," p. 540.

185 deaths; Poona, 305 cases, 262 deaths; Satara, 2,927 cases, 2,209 deaths; Sholapur, 755 cases, 619 deaths; Kolaba, 108 cases, 77 deaths; Ratnagiri, 111 cases, 100 deaths; Belgaum, 2,014 cases, 1,536 deaths; Dharwar, 1,483 cases, 1,150 deaths; Hyderabad, 853 cases, 755 deaths; Kathiawar, 497 cases, 321 deaths; Cutch, 304 cases, 233 deaths; Rewa Kantha, 373 cases, 248 deaths; Kolhapur, 1,232 cases, 790 deaths; Janjira, 169 cases, 146 deaths; Aundh, 82 cases, 57 deaths; Savanur, 69 cases, 53 deaths; Baroda, 1,605 cases, 1,144 deaths. Poona city, 78 cases, 78 deaths; Karachi city, 359 cases, 298 deaths. Europeans, 7 cases, 3 deaths.

EGYPT.—The Director-General, Sanitary Department, reports that during the week ending March 30th, 22 fresh cases of plague and 10 deaths from the disease occurred in Egypt. One case was reported from Abousir; 4 cases from Kom-El-Nour; 13 cases and 8 deaths, three of which occurred out of hospital, from Deshneh; 2 cases and 1 death from small villages near Benha; and 2 cases and 1 death from Korachieh is a village in the Santa Korachieh. Markaz of Gharbieh. From enquiries made there it is evident that the infection was carried thither from Tantah, and it appears that the disease broke out first in February among some Bedouins employed in the Domains Estate; instead of at once informing the Sanitary Department of the existence of cases of suspicious disease followed by death among these workpeople, they were dispersed and their huts destroyed, the result being that these wandering Bedouins have disseminated the disease in several small encampments about Benha.

MAURITIUS.—During the week ending March 28th, 5 fresh cases of plague and 4 deaths from the disease occurred in Mauritius. During the week ending April 3rd, neither fresh cases nor any deaths from plague were reported.

CAPE OF GOOD HOPE.—Plague appears to have completely disappeared from Cape Colony.

#### PLAGUE PRECAUTIONS.

WE notice with a very great deal of pleasure that the Sanitary Authorities are now taking wholesome measures to fight against the plague. The washing of the streets with carbolic disinfectant cannot but prove fruitful of good results and, however expensive the operations may prove, it cannot be too often and too thoroughly carried out. If drastic measures are promptly and properly taken there may be some hope of stamping out this fell disease from the Colony, and should this once be accomplished it might not prove very difficult to keep the disease away. It is a fact that we have disease with us and that it will stay unless every possible facility is given to the very capable and energetic Sanitary Officials who now have to stifle it by their own special methods. We congratulate the Sanitary Authority in having taken the wise steps we have just referred to and would strongly urge that they should entirely yield to the suggestions and recommendations of the gentlemen who have been lately brought to the Colony with the special and sole object of fighting the plague.—Hong Kong Telegraph, March 10th, 1902.

#### EXCHANGES.

Annali di Medicina Navale. Archiv für Schiffs u. Tropen Hygiene. Archives de Medicine Navale. Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie. Australasian Medical Gazette. Boletin de Medicina Naval. Boston Medical and Surgical Journal. Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology. British Medical Journal. Brooklyn Medical Journal. Caducée. Climate. Clinical Journal. Clinical Review. Giornale Medico del R. Esercito Hong Kong Telegraph. Il Policlinico. Indian Engineering. Indian Medical Gazette. Indian Medical Record. Journal of Balneology and Climatology. Journal of Laryngology and Otology. Journal of the American Medical Association. La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal. Medical Brief. Medical Missionary Journal. Medical Record. Medical Review. Merck's Archives. New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyclinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo.

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## Original Communications.

#### A THEORY TO EXPLAIN HOW MAN AND THE ANOPHELES ORIGINALLY BECAME INFECTED WITH THE MALARIAL GERM.

By Albert J. Chalmers, M.D., F.R.C.S. Registrar Ceylon Medical College, Colombo, Ceylon.

#### INTRODUCTORY.

By kind permission of His Excellency the Right Honourable Sir West Ridgeway, G.C.M.G., K.C.B., K.C.S.I., Governor of Ceylon, I am permitted to offer for publication this attempt to answer the following questions which are often asked by medical and nonmedical persons interested in malaria:-

(1) Is it not possible that the infection of man may take place by some other means than by a blood-sucking animal?

(2) How did the cycle of the life history in man and the mosquito start?

It appears to me important to state a theory which will attempt to give reasons why the mosquito is probably the only means of infection at the present time, and also to show how the infection started. The reason why it is important to do this is to try to leave no possible excuse for any person to avoid taking reasonable and simple precautions to prevent himself becoming infected with malarial fever, as the actual demonstration of the fact that the mosquito is the cause has already been given.

These two questions can only be answered by considering the probable evolution of the malarial parasite; and though this of course is only a theory and not open to any proof, yet it will indicate a possible

path of infection.

THE EVOLUTION OF THE MALARIAL GERM.

Some of the lowest unicellular forms of animal life, called protozoa, live more or less unprotected in water, though many have evolved various means of defence.

Those unprotected unicellular animals which, in the world's early history, found their way into the digestive canal of higher animals in drinking water would, if they survived the action of the digestive juices (as many do), find themselves able to grow, multiply, and live more easily than those in the outside world; but they would have to produce a large number of spores by the lowest form of reproduction, i.e., the asexual, and these spores would have to be more or less resisting to digestive juices, &c., in order to reproduce the species. In this way a class of animals represented now-a days by the sporozoa, i.e., animals reproducing asexually by spores, would arise. (They also reproduce sexually at the present time.) But many members of the sporozoa would probably find the action of the digestive juices very irritating, and would therefore be driven to seek further protection, e.g., such as is offered by living in the interior of a cell lining the digestive canal, which is exactly what some members of the Coccididæ, viz., Coccidium Oviforme in man and rabbits, do at the present day. This animal is known to reproduce itself asexually and sexually very much in the same way as the malarial germ does, except that it all takes place in the alimentary canal of its host, and that infection is by means of substances swallowed.

Other members of the Coccidiidæ, however, passed either through the cells, or more likely between the cells lining the digestive tract, into mucous membrane of the digestive tract which lies under these cells. (At the present day this is actually done by some Cocciidæ.) There they would find new enemies waiting for them, viz., the so-called white blood cells or phagocytes, and to further protect themselves they wandered (e.g., Coccidium Oviforme), some into the liver, while others entered the capillary blood-vessels and lay free in the blood stream, just as the spores and the young malarial germs do to day; but even here they would be liable to be attacked by the phagocyte, and to avoid them still further they entered the red blood cell, where they found a haven of rest till the discovery of quinine. Those which did not find this haven would eventually die out in the struggle for existence. The unicellular animals who did this are to-day called Hæmamæbidæ, and are known to cause disease in man, cattle, several birds (pigeons, larks, sparrows, starlings, owls, screech owls), and in frogs

Once in the red blood cells they will circulate all over the body, and at some time or other will be found in the skin.

#### THE INFECTION OF THE MOSQUITO.

By the time that these Hæmamæbidæ had undergone their evolution in the tissues of warm-blooded animals the gnats would have evolved, and would have acquired their peculiar mouth apparatus for piercing tough structures and for sucking juices; and the females of certain of these gnats would have acquired the habit of taking in warm blood for the

development of their eggs.

Consequently sooner or later the malarial parasites would find themselves transferred from the tissues of the skin of man to the stomach of a mosquito. In this new habitat they would be liberated from the red blood cell (e.g., the present day quartan and tertian gametocytes), probably by their own action. finding themselves unprotected in this new and probably not too congenial abode, they would hasten to do what all unicellar animals try to do under such circumstances, viz., "conjugate." The development of such motile threads as the male spermatozoa would accelerate this act, as they would be chemically attracted by the female cells, and this might be highly beneficial if the juices in the stomach of the mosquito were unfavourable, as, for example, they appear to be in culex, and many other blood suckers.

The energy introduced by the male element into the female would induce the result of the union (the vermicule) to wander about to seek some protection

from these irritating juices.

Consequently those vermicules would survive which passed between the cells of the stomach of the mosquito, even as their ancestors had done in the stomach and intestines of higher animals, but finding nothing much on the other side of these cells (instead of a nutritious mucous membrane), they would, as other protozoa do in troubled times, become encysted (zygote), and break up into spores (blastophores and blasts), and these, by bursting of the capsule, would be liberated into the cavity surrounding the stomach of the mosquito, and would go from thence into its various organs, including the salivary glands, and from these to its saliva, and hence to man again.

The hæmamæba of malaria in man develops in a mosquito called the Anopheles, which is not very common, that of the bird in Culex pipiens, which is common, and that of Texas fever in cattle in a tick. When once such a suitable course of life history is entered upon, those germs which fail to carry it out die, i.e., the germs of malarial fever in such Culex die; consequently only one species is left (the most suitable for the life of the parasite), by means of which it can be propagated, viz., the anopheles mosquito. In this way an explanation of the original mode of entry of the malarial germ into the human

being and of the original method of infection of the mosquito is possible. The vertebrate host, including man, must have been the original host, because in him the adult stage of the animal's life history is found; the mosquito is of importance in the sexual

production and in propagating the parasite.

Summary.—By the action of the digestive juices the protozoa which enter the digestive tract of higher animals find themselves weeded out into those which can resist the juice with immunity and those which cannot. Those of the latter which do not seek further protection die out, the others seek protection by getting under cover of the lining cells of the digestive tract. Those which pass under the cells into the mucous membrane find new foes, to avoid which they enter the red blood cells. The gnat now swallows the red blood cell containing the parasite. The parasite again finds itself in a digestive tract with juices, and again protects itself by passing under the mucous membrane, and to reproduce its species breaks up into a large number of blasts.

#### SMALL-POX AND VACCINATION IN BANGKOK.

By P. A. NIGHTINGALE, M.D. (Harrogate). Formerly of Bangkok, Siam.

THE Asiatics resident in the capital of Siam (whose estimated population is over 400,000) form a striking object lesson to the "conscientious objector" in Britain.

Living for the most part in a state of jus naturale, in the original sense of the term, they are accustomed to the dreadful ravages of most of the more deadly tropical diseases and accept them as part of their fate without a murmur, knowing that under the existing local conditions there is not much to be done against

cholera, dysentery and malarial fever.

But when it comes to small-pox they are on different ground, and fully realise the marvellous prophylactic value of "efficient" vaccination. Though there is no law dealing with the subject the upper classes almost invariably employ European medical men to vaccinate their children during the cooler months of the year, while the middle class save up their money and buy the lymph themselves-the mother or Buddhist priest performing the operation. For the lower and coolie class the Government is beginning to open free vaccination stations, both in Bangkok and the provinces, which will be taken more advantage of as their existence gets more widely known.

A Siamese mother will insist in a way which ought to put to shame her more enlightened sisters over here, that four large "marks" be made-on the right arm for girls, and on the left for boys—and will tell you that if they all "take" there is no need for re-vaccination later on, but if only one or two of the insertions are successful they will certainly wish for the operation to be repeated within a very few years.

As their garments are scanty in the highest degree, there is seldom any trouble from the introduction of foreign material into the pustules from foul coverings; about the fourth day they will neatly cover up each mark with some native paste largely composed of turmeric, which seems to allay all irritation, and is only finally removed when the arm is quite healed.

Once vaccinated, they lose all fear of the disease, and will cheerfully live, and even sleep, with an

affected case in any stage.

Of course small-pox is always endemic, and from time to time epidemic, in Bangkok, but (in the absence of all statistics) judging from the yearly number of cases which come under one's personal supervision, it is undoubtedly gradually dying out, though the general sanitation connected with the lives of the lower classes is not improving at the same rate.

Dr. Campbell Highet, the Medical Officer of Health, hopes soon to establish an animal vaccine station, and when this is affected many of the present difficulties connected with the supply of lymph will be done away with, and voluntary vaccination undoubtedly

largely increase.

Altogether a striking object lesson is taking place in Bangkok, a lesson which it is only a pity that "conscientious objectors" in Britain cannot examine for themselves, instead of being fed up on literature written by persons who have never practically studied small-pox in its far Eastern home, among a people who are bound by no law save a natural desire to live, and who are gradually "working out their own salvation."

#### A PECULIAR AND UNDESCRIBED AFFECTION OF THE NOSE.

By Dr. J. C. MITCHELL. Grahamstown, Cape Colony.

An interesting observation, illustrated by the photograph I am sending, is a form (apparently undescribed) of disease affecting the nose in natives. I was fortunate to see in the lock wards of the hospital three cases which were diagnosed as syphilis. In the girl on the left in the photo the diagnosis is probably correct. The condition healed under the exhibition of K.I., and the scar is typically syphilitic.

The right hand case may be taken to show an early condition of the central one. It had lasted some months, and according to the patient it had com-menced by the formation of small, hard nodules under the skin, which gradually enlarged, till at the time of examination they were of the size of small peas. A serous fluid exuded from the surface of the older ones which formed a crust over the surface. There was no ulceration. In the central case the condition has gone on to ulceration and much loss of tissue. The nodular condition still persists on the skin, covering the alæ nasi and tip, but the septum and upper lip are much eroded. The floor of the ulcer, light coloured in the picture, presented numerous raw protuberant granulations quite unlike a syphilitic ulcer.

The condition in the early and later stages is not painful and the nodules are almost anæsthetic. In neither of these cases were the mucous membranes of the mouth, fauces, or pharynx affected, though that of the anterior part of the nose was. There was further no history or sign of syphilis in either of these

cases. I made arrangements to have pieces excised for excavation, but both girls left before this could be done. One-the central one-has returned with the condition unchanged, so that I may have an opportunity of observing her further.

The appearance and history, together with the marked resistance to iodide of potassium, is against

syphilis. Is it rhinosclerosis?

#### PLAGUE PROPHYLAXIS IN FORMOSA.

By JAMES L. MAXWELL, M.D.Lond.

Now that the bubonic plague bids fair to become pandemic in its grasp, and the danger seems no longer to be confined to Eastern lands, any new method of treatment or new application of old methods may well be seriously considered. This alone can be my excuse for touching on a subject about which so much has lately been penned. In brief, I wish to describe the prophylactic measures adopted by the Japanese medical authorities in the Island of Formosa. My remarks will principally apply to the old capital of the Island, Tainan, in which I am myself resident, and in which I have watched the measures here described in their

process of action.

Your readers will remember that the Japanese have only possessed the island since the termination of the late Chino-Japanese war, and even then it had all to be taken at the point of the sword. As a result of this, the conquerors have been able to deal with the natives without any regard to their natural prejudices, which I need hardly point out could scarcely be done in a civilised state with ancient laws. I feel at once this is the weakness of the system I am about to describe, and probably would prove fatal to it in most other places, though I see no reason why it should not be enforced in single places like Hong-Kong, or among part of the population, as say, among the natives in Cape Town.

The system consists in the compulsory inoculation of plague toxins, the preparation used being that of Professor Kitasato, prepared in his laboratories in Tokyo. As this differs from Professor Haffkine's preparation in some very important particulars, it would be well at once to mention its method of manufacture. The bacillus taken directly from an infecting bubo, or from the blood of a septicæmic case, is cultivated on sloped agar tubes in an incubator, at the temperature of 31 to 32 C., for from forty

to seventy hours.

The surface of the cultures is then scraped, the scrapings pounded in a sterilised mortar, and sterilised normal salt solution is added to a fixed dilution. The solution is then filtered through a fine wire sieve, and the filtrate heated to 60 per cent. for thirty minutes. Carbolic acid is added till it is present in the solution to the strength of 5 per cent. The preparation is kept in ice, and cultures and animal inoculations are made to prove its sterility. It is then sealed in

sterilised bottles and is ready for use.

In addition to these differences in preparation from Haffkine's fluid, there are also very marked differences in its physical action. I have not personally experienced or observed the use of Haffkine's fluid, but I have been told by medical men who have experienced and observed its use that its action is nearly always very distressing to the patients, sometimes really causing severe and prolonged physical effects. I have myself been thrice inoculated, and have seen numerous cases of inoculation with Kitasato's fluid, and have never seen a patient confined to bed with it, or seriously inconvenienced in any way.

Tainan, to which city I shall principally refer, is a Chinese city of nearly 50,000 souls. In saying it is Chinese I mean to imply that it has the narrow streets, the low filthy shops, and all the other objectionable features of the cities of the Celestial Empire. True, it never was as bad as its neighbours on the mainland, and the Japanese have made many improvements both in the way of cleanliness and in driving a few large roads through the city. But it still remains a place where the best disinfecting measures would be utterly thrown away—an Augean stable which it would take a Hercules indeed to cleanse. Under these circumstances the authorities have very wisely abstained from pushing disinfecting measures to any great extent, contenting themselves with a few general regulations and these inoculations, which I will now describe.

At first an attempt was made to isolate the relations of the patients by sealing the houses in which a case had occurred; but this was never a very successful measure, and after a time was more or less dropped.

After a few sporadic cases during January and February, 1901, the real epidemic began about the earlier part of March and raged till the middle of July. At the height of the disease there was a known death-rate of nearly fifty a day, and as many deaths were concealed, bodies being buried in the houses, gardens, and, indeed, every conceivable place, to escape the eye of the officials, this death-rate should no doubt have been put at a decidedly higher figure.

The compulsory inoculations were begun rather late in the season or a still larger proportion of the population would have been inoculated. As it was, however, more than 15,000 persons were inoculated in the city alone. The numbers are therefore quite large enough to avoid the errors which smaller figures might lead one into. Some may suggest that the type of disease was mild, but I would negative this, the mortality rate I have already mentioned, and that I shall hereafter mention, are both high, and the cases I saw were, many of them, very severe. The first case to which I was called was a child who became ill shortly before mid-day, and died at 9 p.m. the same night, and I saw many other fulminating cases.

The inoculations were carried out by Dr. Tsukiyama, the senior Government physician in Tainan, and by his assistant, Mr. Kamachi. To the latter I am much indebted for the figures and statistics in this article.

For the purpose of inoculation the city was divided into a number of squares, one of these squares being dealt with at a time, the desire of the authorities being to inoculate as far as possible every one in the city three times, at intervals of about a week. The people in the locality being dealt with were brought into a conveniently situated temple, or other large building, and there inoculated, the men and women

being separately treated. This house to house method had the advantage that it allowed the authorities to discover concealed cases, which, as I have already said, were far from being uncommon. As by this house to house visitation the men were particularly liable to escape inoculation, a second method was adopted of arresting passers by or making surprise visits to the markets. Very careful records of all the inoculated were kept, and should the same person be again arrested his previous records were referred to, and the fact of his second or third inoculation noted. By these methods over 15,000 people in the city alone were inoculated, for the most part, on three successive occasions.

As far as the inoculations themselves go, they are simplicity itself. A spot is selected in the muscles of the back, between the vertebral borders of the two scapulæ, cleansed with an antiseptic wash and with ether, and the inoculation then made deeply by means of an ordinary hypodermic syringe. The quantity injected is 1 gramme on the first occasion, 1.5 grammes on the second, and 2 grammes on the third, the proper interval between inoculations being one week. never saw or heard of any septic trouble in connection with the sites of injections, but once or twice saw a few urticarial spots about the situation of the puncture. As I was attending a good many plague cases myself I gladly submitted to the process, so in mentioning it I am speaking from personal experience. The immediate pain on injection is quite infinitesimal. On each occasion I was inoculated about mid-day. During that afternoon and evening I had a slight aching and stiffness in the muscles involved, accompanied by some swelling at the site of the injection; by the next day this was passing off, but I suffered from slight malaise, not sufficient to prevent my doing my ordinary work. By the following day I was perfectly well again: this was repeated after each inoculation. Personally I suffered from no pyrexia, though I understand that a temperature of 100° F. is not rare. I never saw anyone confined to bed as a result of the inoculations.

Before any of the statistics had been published, I had formed very decidedly favourable opinions with regard to the value of the inoculations from my own observation of my patients. I attended many cases of plague, most of whom met with the usual termination of this fatal disease; yet, though one-third of the city had been injected I only came across two cases of the disease in inoculated persons. In one of these, a young man, the disease was so mild that the patient was hardly confined to bed. The other case was that of a young woman, and was much more severe, but terminated in convalescence, delayed by an indolent sinus following a groin bubo which is only just healed. She, however, had only been inoculated once.

I append to this paper statistical tables dealing with the city of Tainan and then with a few of the neighbouring villages, where also inoculations were carried out, the third table being a summary of the preceding two. I would only like to call your special attention to two of the figures in the last table, the percentages of deaths and the percentages of attacks. A moment's calculation will show that had the attacks among

those inoculated been in the same proportion as among those who were not inoculated, there would have been 578 cases in the place of 41; while had the inoculated died in the same proportion as the non-inoculated, there would have been 34 deaths in the place of 22. These figures speak for themselves and follow, too, a common rule in this class of preventative inoculations, viz., that their effect is principally prophylactic and to a very much smaller extent curative. Statistics, as we all know, are not to be relied on to too great an extent, especially where very small numbers are concerned, but here, where our totals work out into many thousands, the suggestion that we have too few by which to judge can hardly be regarded as tenable. Of course, one must allow that no doubt many attacks and many deaths in the city were concealed, and so escaped these tables, but there can be no reason to suppose that these deaths would militate against the statistics here brought forward. Rather it would be to the advantage of the people to conceal deaths among those who had managed illegally to avoid inoculation, and to make the most of those who had been inoculated and yet died, as it need hardly be said the prejudiced Chinese view with great distaste the compulsory inoculation.

			Y	TAINA	n Ci	TY.				14	
Total Population	Number Inoculated	Number t Inoculated		acked Plague		nber eaths	Deaths	tage of among ttacked	Percentage of those afterwards Attacked by Plague		
T Popu	Nur	Nu not In	Inocu- lated	Not In- oculated	Inocu- lated	Not In- oculated	Inocu- lated	Not In- oculated	Inocu- lated	Not In- oculated	
47,382	15,678	31,704	30	1,130	13	948	43.33	83.89	·19	3.64	

		NEIGH	BOURIN	G V	ILLAC	ES.			
	Total pulation	Number loculated	Number Inoculated		cked lague		nber eaths	those wards A	ntage of after- attacked lague
,	Total Population	Number Inoculated	Nun not Ino	Inocu- lated	Not In-	Inocu-	Not In- oculated	Inocu- lated	Not In- oculated
Anping	5,378	605	4,773	1	21	1	17	·16	•44
Tai-ko	631	124	507	2	87	2	69	1.61	17.16
Tsan-bun	158	72	86	1	8	1	5	1.39	9.30
Kagi	19,039	2,075	16,964	2	231	2	199	0.9	1:36
Poa-ka	6,677	2,097	4,580	5	170	3	148	2.4	3.71

otal ilation	Total Population Number Inocuiated	Number Inoculated		acked Plague		aber of eaths	Deaths	tage of among ttacked	Percentage of those afterwards Attacked by Plague		
Popt	Nur	Nu not Im	Inocu- lated	Not In-	Inocu-	Not In- oculated	Inocu- lated	Not In- oculated	Inocu- lared	Not In-	
79,265	20,651	58,614	41	1,647	22	1,386	56.09	.84.15	·19	2.80	

To sum up. By a method of inoculation easily applied and causing a minimum of discomfort a very large reduction has been made in the numbers attacked by plague in this place, and a decided reduction in the number of the deaths among those attacked.

As I have already said, the exceptional political circumstances of this island make it possible to carry out compulsory inoculation in a way which probably could not be done in many places. In isolated colonies, however, this might be possible, at least among the native populations, and a wide circle of "contacts" might easily be treated when sporadic cases break out in our own cities.

THE DURATION OF THE LATENCY OF MALARIA AFTER PRIMARY INFECTION, AS PROVED BY TERTIAN OR QUARTAN PERIODICITY, OR DEMONSTRATION OF THE PARASITE IN THE BLOOD.

By Dr. ATTILIO CACCINI,

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(Translated from the Italian by St. Clair Thomson, M.D.Lond., F.R.C.S.)

(Continued from page 122.)

#### PART II.

ON RELAPSES AT SHORT INTERVALS.

THE factors of which we spoke in the preceding chapter, manifest, as we said, their influence particularly in determining the relapses at long intervals.

On the other hand, on the relapses at short intervals the effect of treatment by quinine is very much more important, and hence I avail myself of this fact to divide into several groups and sub-groups the results obtained in regard to relapses at short intervals, and I will first refer to spring tertian, then to the quartan, and then to the malignant tertian.

I will commence by saying that the quinine treat-

ment influences the quota of relapses.

In regard to the treatment, malarial patients can be divided into two great categories:—

(A) Patients who have had quininism.

(B) Patients who have never had quininism.

Chapter 1.—Spring Tertian.

(1) ON THE RELAPSES AT SHORT INTERVALS IN PATIENTS WHO HAD QUININE IN THE FIRST INFECTION.

Commencing with what takes place in individuals submitted to the quinine treatment, we must make a clear distinction between those who have been submitted to rational administration of quinine, and those who have carried out the treatment in a more or less irregular manner.

Hence I divide my cases into three categories:—

(A) Cases in which the quinine treatment was carried out early and systematically.<sup>1</sup>

<sup>1</sup> By systematic treatment, I mean the administration of quinine before the febrile access, in such a manner that it is in circulation exactly at the moment of sporulation of the parasites.



(B) Cases with a retarded systematic treatment—that is, cases in which the treatment was systematic, although initiated late and after the outbreak of many attacks

(C) Cases treated without system—that is, in which the administration of the salt of quinine was carried out every day, but without any precision, and in variable doses; either administered quite irregularly, or during the febrile acme, or during the period of perspiration.

From a tabular exposition of these cases it is at once seen how with the intensity and quality of the quinine treatment the malarial infection varies in its behaviour, both in respect to the appearance of the relapses, and in the case of relapses, in respect to their gravity, precocity, and number.

## GENERAL EXPLANATION OF THE MANNER IN WHICH THE TABLES WERE COMPILED.

(A) In the first vertical column are indicated the number of days during which the several patients were under observation.

(B) In the second vertical column I indicate the number of patients studied in correspondence to the

length of observation.

Total

.. 5 .. 23 ..

(C) In the successive vertical lines I indicate the number of patients who relapsed, and particularly in the first column, those who relapsed after five days of observation: in the second column those who relapsed after six days, and so on after seven, eight, &c., days, as is indicated by the numbers in the horizontal line at the head of the Table.

Thus, for example, in Table No. 3, we were able to follow for seven days, 21 patients, of whom 2 relapsed on the fifth day of apyrexia, the others disappeared from observation without having presented a relapse, and proceeding with eight days of observation 20 cases were followed; of which 1 relapsed upon the sixth day, and 1 on the eighth day of apyrexia, and so on for every Table.

TABLE I.

GENERAL CONSIDERATIONS—Year 1900.

Malignant Tertian.

	Jun	е	July		Aug.		Sept.		Oct.		Nov.		Dec.		Tota
Primary							510								
Relapsing	5		10	• •	317		182	٠.	217	٠.	120	٠.	100		946
Total			248		741		692		393		250		101		2,325
					Spri	ing	Teri	tia	n.						
	Jun	e	July		Aug.		Sept.		Oct.		Nov.		Dec.		Tota
Primary Releasing															
Relapsing	3 00	,	14	•••	31	• •	14	• •	00	• •	100	•••	15	• •	365
Total .	. 57	٠.	124		92		92		241		110		78		794
					-	2011	ırtan							R	
		_				_		-				_	_		
Primery		е					Sept.								Total
Primary Relapsing															

6 .. 82 .. 143 .. 90 .. 66 .. 415

01-4-		ne	July	A	ug.	Sept.	Oct.	Nov.	Dec.	Total
Complete Total	. 6	2	395	8	39	 866	 777	 450	 245	3,534

#### TABLE II.

CASES OF QUARTAN WHICH RELAPSED AFTER THE INTER-VENTION OF ONE OF THE ORDINARY DETERMINING FACTORS.

ot	General servations	Attacks before the finishing of the fever	Duration of the apyrexial period before the intervention of the determining factor	Duration of the apyrexial period after that factor	Determining factor	Febrile attacks during the relapse
1	Peasant, aged 28, primary	6	30 days	2 days	Contusion on the thorax and abdomen	3
2	Peasant, aged 40.	5	25 days	2 days	Rain	5
3	Peasant, aged 27.	9	26 days	2 days	Rain	2
4	Student, aged 16.	7	24 days	2 days	Cold bath	3
5	Peasant, aged 19.	5	19 days	2 days	Cold bath	2
6	Peasant, aged 48.	10	22 days	36 hours	Excessive heat	2
7	Peasant, aged 21.	6	27 days	29 hours	Drunkenness, fighting and wounds	2
8	Peasant, aged 26.	6	18 days	2 days	Chloroform	3

#### EXPLANATION OF TABLE II.

None of these patients had ever taken quinine.

TABLE IIA.

GENERAL CONSIDERATIONS—Year 1901.

Malignant Tertian.

		J	une	July	Aug.	Sept.	Oct.	Nov.	Total
Primar	y		7	67	429	225	136	32	896
Relapsi	ng			11	192	159		25	
Total			7	78	621	384	232	57	1,379

#### Spring Tertian.

14		Jun	e	July	Aug.	Sept	Oct	Nov	Total
Primary Relapsin					$\frac{298}{249}$				
Total	 	77		249	 542	 287	 79	 22	 1256

#### Quartan.

	June	July	Aug.	Sept.	Oct.	Nov.	Total
Primary Relapsing		. 3 . 22			$\begin{array}{c} 128 \ \dots \\ 72 \ \dots \end{array}$		
Total	14 .	. 25	20	154	200	27	440

	June	July	Aug.	Sept.	Oct.	Nov.	Total
Complete Total	98 .	. 352	1,183	825	511	106 .	.3,075

TABLE III.
Spring Tertian Treated Systematically and Early.

Days of Ob-	No. Cases		Du	ratio	n of	the	Late	nt P	eriod	Calc	culat	ed in	Day	78	
Day ser	· Jo	5	6	7	8	9	10	11	12	13	14	15	16	17	18
7	21	2					- 2				-	7.0	7		
8	20	2	1		1							300			
10	10		1	1	1	1						- 11			
15	10		1	1	1	1	1		2	1	1				
21	6		1	1		1		1		4.1					
25	9			1			1		1	1				1	
30	10			1				1				1	1	1	1
35	10						1				1	1	1		1
40	7								1		1			1	1
45	6									1		1		1	ī
50	9														1
55	6									1			1		1
60	5											1			1
90	3														ī
100	3														1
110	2														
120	2														
130	4														1
140	2				••										
Tota	al per	-	-		******	-		-	-	-			-	_	-
da	ау	4	4	5	3	3	3	2	. 4	4	3	4	3	4	10

TABLE IV. SPRING TERTIAN WITH DELAYED SYSTEMATIC TREATMENT.

of Ob-	Days of Ob- servation No. of Cases		Du	ıratio	on of	the	Late	nt Pe	riod	Calc	ulate	d in	Days		
Days	S.S.	5	6	7	8	9	10	11	12	13	14	15	16	17	18
16	30	2			2			1		1					
17	22		2			2		2				1	1		
18	20			1		1					2	2			2
19	26						2		2						2
20	16									2			2		2
23	20									1		1		4	2 2 3
24	24								1			1	1		1
25	12										1		1		1
26	16								1			1	1		1
27	15									1	1				
29	10												1	2	1
32	10												2	2	1
33	9												1	1	1
34	10										1		1		1
36	7												1	1	1
40	12											1	1		1
45	10													2	1
50	9													1	1
55	4														1
60	3													1	
65	6										1				
90	2											1			
100	2														
110	2														
120	2														
130	1														
140	1				••	••									1
Tota da	l per	2	2	1	2	3	2	3	4	5	6	8	13	14	23

#### EXPLANATION OF TABLE III.

None of those patients had previously taken quinine before entering the hospital. They were given quinine on alternate days in doses of 1½ to 2 grammes per day, in three or four doses, about half-an-hour's interval between them, starting the administration of the remedy three hours before the commencement of the fever.

In those who remained more than ten days permanently in the hospital the treatment was suspended after seven days. This intense method of treatment never produced any disturbance except occasionally some vomiting. To obviate this drawback we administered the remedy in the same dose by endo-muscular injections, always before the initiation of the fever. The cure was recommenced every time that a relapse set in.

#### EXPLANATION OF TABLE IV.

None of these patients had ever taken quinine before entering the hospital. The quinine was administered on alternate days in the same method as that for the patients described in the preceding table. In rare cases we were forced to have recourse to injections of quinine, but as a rule the remedy was administered by the mouth. The treatment was renewed on the outbreak of relapse.

TABLE V.
Spring Tertian with Daily Quinine.

Days of Ob- servation	No. of Cases		Du	ratio	n of	the	Late	nt P	eriod	Cal	ulat	ed in	Day	ys.	
Day	ZO	5	6	7	8	9	10	11	12	13	14	15	16	17	18
6	110	10	10												
8	112	10	9	10											
10	140		8	10	15	9									
12	150	1	6	10	10	11									
14	100	3	10	10	9	12	11	9	15	10					
15	90	10	6	4	9	12	2		9	6	4				
16	91	10	9	6	10	11	10	14	10	7	3	1	2		
18	42	99	1	7	6	8					1				
20	10	1	2	1	1	1	1	1							
21	18	1	1	3	2	1	1	1	1	2	1		1		
22	16	1	1	2	1	.1	2	3	1	1	1			1	
24	10	2	2	1	1	1	1	1				1			
26	12	2	1	1	2	1	2	3					1		
28	15	2	3	2	1		. 1	1		1		1		1	
30	10	1	2	1		1		1	1			1		1	1
31	19	1	2	2	1	1	1		1		1				1
34	10	1	1	2	1		1		1				1		
36	10		1	2	1		2	1	1	1					
41	10	2	1	1	1	1		1		1	1	1			
50	10	1	1	1		1	1		1	1	1				
60	9		1	1	1			1							
70	8	1			1		1		1						
	l per		_		=	_	-	-	_	_	_	_	-	-	-
da	ay	159	78	77	73	72	37	37	42	30	13	5	5	3	2

#### EXPLANATION OF TABLE V.

These patients had never taken quinine. The remedy was administered in doses varying from 1 to 2 grammes per day by the mouth, without selecting any special period. The treatment, as a rule, was suspended after seven to ten days, and it was renewed on the outbreak of a relapse.

#### EXPLANATION OF TABLE VI.

These patients had never taken quinine before entering the hospital. It was administered in doses of  $1\frac{1}{2}$  grammes during the febrile acme, then repeated on successive days at the same hour. In this way the quinine was repeated every seven days, and resumed in the same method on the outbreak of a relapse. Of thirty-eight patients who relapsed, in ten of them we were able to follow more than one relapse. These relapses take place always within from five to ten days without a fixed period.

TABLE VI.

Cases of Spring Tertian with Quinine during the Febrile Acme.

Days of Observation	No. of Cases		Dt	ratio	on of	the	Late	nt Pe	riod	Calc	ulate	d in	Days	3	
Day	20	5	6	7	8	9	10	11	12	18	14	15	16	17	18
7	6	1	1										1		
8	9	1	2	2											
9	7	1	1	2	2										
11	4	1	1	1											
12	2	1			1										
13	5	1	1		1	1	1					3.0			
15	2	1				1								-00	
17	3	1		1		- 11	1	3	4.						
18	3	1	100	1	1	44			11	11		-11			
19	3	1	1	1	4.7				14			60.	0.00		
20	1		1	1	14	11									
21	1			1											
23	1	1													
24	1		1										188		
25	1	1						10.0							
26	1		1	18											
Total	ner		-			-				-	-			_	-
da	у	12	10	9	5	2	3								

TABLE VII.

SPRING TERTIAN; QUININE DURING SWEATING STAGE.

Days of Ob- servation No. of Cases			Du	ratio	n of	the	Late	nt P	eriod	Calc	culat	ed in	Day	's	
Days	NO	5	6	7	8	9	10	11	12	13	14	15	16	17	18
7	7	1	2	3											
8 9	8 -		2	2											
9	5	2	2	1											
10	6	1	2	1	1	2									
12	4	1	2	2											
14	3	2	2	1	1	1		1							
17	1														
20	1		1							- 54			1		
21	2	1		1											
23	1 .														-
26	1		1												
28 .	2 -							1		1					
11	2				1										
31	1														
32	3							1							
36	1 -							*						7.1	
90	2							1						1	
91	1									1					
		_	_	-		_	_	_	_	_	_	_		-	
Cota	per														
da	y	8	13	11	3	3		4		2					

### EXPLANATION OF TABLE VII.

These patients had never taken quinine before coming into the hospital. The remedy was administered to them in the dose of 1½ grammes per day, during the sweating stage and repeated two days afterwards at the same hour, and so on; in all for seven days. After that the remedy was suspended until the relapse.

#### EXPLANATION OF TABLE VIII.

The greater number of these patients had already taken quinine very irregularly before coming into the hospital. The treatment was continued within the hospital, but also irregularly, the remedy being given erratically both as regards quantity, hour, and length of treatment.

#### TABLE VIII.

CASES OF SPRING TERTIAN; QUININE GIVEN IRREGULARLY.

Days of Ob- servation.	No. of Cases		D	urati	on o	the	Late	nt P	eriod	Calc	ulate	ed in	Days		
Days	S S	5	6	7	8	9	10	11	12	13	14	15	16	17	18
7	29	12	14												
9	26	4	7	5	9					1	•				
11	24		7	9	8	6				•					.,
13	20	1	12	4	3	1									
15	19		1	3	5	2	1		1	2					
17	10		1		1	1	2	1			1				
18	19			1	2	3	2	1	1		2	1	1	1	
19	14		1	1	3	2			1	4	2				
20	16		1		2	5	3	1							•
22	13		1				2	4	1						
25	10			1	1	2	1	1	2	1					
29	12		1		1	1	3	1	1	1		1			
30	9		2	1		1	2	1		1			33		
31	7		.1	1		1		2	1						٠.
33	10			1	2	1	.1	1	1						
36	11		1	1			1	2	1						
39	12			2	1	2	1	1							
40	13		1	1	1		.2	1	1			1			
50	4			1	1,	1		1							
60	7		1		1		2								
70	5			1	1	1			1						
0	2			1											1
Tota	l per	•••	-	-		-	-	-		-		_		-	_
da	y	17	52	34	48	30	23	18	12	9	5	3	1	1	1

 Of 145 cases treated early and systematically, a relapse only occurred in 37 per cent.

(2) Of 301 cases treated systematically, but started somewhat late, there was a relapse in 30 per cent.

(3) Of 1,002 cases with daily quinine there was a relapse in 15 per cent.

(4) Of 50 cases submitted to quinine during the acme, there was a relapse in about 80 per cent.

(5) Of 55 cases given quinine during the sweating stage, there was also a relapse in 80 per cent.

(6) Of 291 cases to whom quinine was given irregularly, there was a relapse in 85 per cent.

(7) Lastly, in 120 cases to whom quinine was not given, there was only one in which a complete cure took place (whence we may regard it as a quite exceptional fact).

(To be continued.)

CARCINOMA AND MALARIA.—Prochnik publishes his observations on carcinoma and its prevalence in malarial countries in the Weiner Klin. Wochenschrift, January 30th. He states: that in Java, where he gained his experience, cancer is not at all rare, and that malaria prevails to such an extent that practically every person in Java suffers from malarial infection in some form. He concludes, therefore, that malaria is in no way antagonistic to the evolution of carcinoma. Prochnik even goes so far in the opposite direction as to advance the idea that malaria predisposes to carcinoma of the liver. Hepatic carcinoma, according to Prochnik, is the most common form of malignancy met with in Java.



To illustrate Dr. MITCHELL's article—"A peculiar and undescribed affection of the nose."

(See page 135.)

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THE

## Journal of Tropical Medicine

MAY 1, 1902.

#### PLAGUE IN THE PUNJAB.

THE havoc that plague is causing amongst perhaps the finest race of people in India is from every point of view a calamity. The extent of the epidemic may be judged by the fact that during the months of January and February of this year the deaths from plague in the Punjab numbered 13,466 and 29,493 respectively; and during March they reached the enormous total of 84,949. Taking the population of the Punjab as 20,000,000, the extent and virulence of this epidemic finds no parallel in modern times. The influences that have prevailed to bring about this state of affairs is sought to be attributed to the effects of non-intervention with the customs and wishes of the people, but whether this is scientifically correct is another matter. It would certainly appear that the imposition of stringent regulations as to quarantine, isolation, disinfection, &c., during the years when plague first appeared in the Punjab, coincided with a distinct limitation of the disease, and that, on the other hand, when these restraints and precautions were removed, plague appeared in a virulent form. Neglecting therefore the possibility of other causes being at work to produce this marked change, it may be useful to trace the history of the disease in the Punjab.

Plague first appeared in the Punjab in 1897, and during the three subsequent years the disease was confined to a comparatively small area, while the mortality was insignificant. During these years it was at one time hoped that plague might be stamped out altogether, but Captain James, who carefully watched the progress of the disease, was of a different opinion. He observed that although the outbreaks were limited, mild, and capable of being controlled, that the area of infection slowly but surely increased in all directions, and that by the winter of 1900-01 a wide tract of country was infected.

During the first years of the outbreak of plague in the Punjab the measures adopted to combat the disease consisted of: (1) Observation of the health of the villages in the infected area; (2) segregation of sick and contacts; (3) restriction of the movements of the population of infected villages by cordons of sentries; (4) disinfection of houses and household property; (5) railway inspection; (6) anti-plague inoculation; (7) surveillance of persons arriving at a healthy village from an infected area—in fact all the hygienic machinery known at the present day was put in

Stringent measures such as those indicated above could not be maintained indefinitely, but only when isolated villages were attacked. was plain that if the disease attained larger dimensions, and if large towns were attacked, these regulations could not possibly be maintained. The very limitation of the outbreak of the disease, however, proved detrimental to the enforcement of sanitary rules, for the people doubted the necessity for such measures. attitude, which at first was one of passive obstruction, became in time more active, and culminated in a serious riot at Garshankar.

It is a peculiar feature of the spread of plague in the Punjab that the disease first attacked the small country villages, and even now the larger towns are not seriously affected.

Partly because plague appeared to be limited in virulence and extent, and largely in consonance with the clamouring of the people, the Government consented to remove the restrictions and regulations that had existed for some four years. Coincidently with this proclamation, and it may be because of it, plague broke out with a severity previously unknown; but had these restrictions not been removed it would have been absolutely impossible to maintain them when plague had attained a firm hold on the population. The necessity for rules and regulations as a means of prophylaxis against plague, and for quite another set of regulations when an epidemic is raging, was never more conclusively proved.

The relative value of the measures to be taken against plague during an epidemic may be ennumerated in the following order as to their effectiveness: (1) Prevention of free movement amongst the people; (2) evacuation of infected villages; (3) disinfection of houses, &c.; (4) inoculation.

The Punjabis, since plague has become widespread amongst them, are becoming more amenable to be guided by the authorities. Should that spirit increase, it may be possible to teach them in what direction danger lies and how it can be avoided. Without the intelligent assistance of the people it is impossible to combat a plague epidemic. The people themselves must be taught the importance of excluding persons coming from infected areas, to report suspected illnesses, to see the advantage of segregation of contacts, the benefits of inoculation, disinfection, &c., and to take such public health precautions as are essential. The willingness of the people to aid the Government comes late, but as plague will certainly recur next winter, even should the present epidemic die in the summer as it probably will, the way may be smoothed, so that it may be possible to deal with future outbreaks more effectively.

## THE SUBCUTANEOUS INJECTION OF QUININE.

By Charles A. Bentley, M.B., C.M.Edin. Borjulie, Tezpur, Assam.

THE discussion that has taken place in the columns of the Journal of Tropical Medicine regarding the use of quinine by subcutaneous or intercellular injection has called attention to a subject of great interest to medical men practicing in the Tropics and in all malarial-infected parts of the world. The general tenor of the papers that have already appeared upon the subject seems to indicate that a large number of medical men still regard this method of using quinine with more or less suspicion. It is impossible to deny but that in the experience of large numbers of practitioners there are strong grounds for the belief that solutions of quinine introduced beneath the skin act in a very marked way as predisposing agents for the production of abscesses and obstinate ulceration. I think, however, it will be found that it is not a common occurrence for those who use the methods under discussion as a daily routine practice, to meet with the cases of local gangrene described by so many of the previous correspondents.

In my experience of many hundreds of injections of quinine I have only once had ulceration following upon the injection, and that was in a case when I was obliged by force of circumstances to use an old hypodermic syringe which resisted all one's efforts to render it perfectly aseptic. Since I adopted the hypodermic method of treatment as a routine practice in cases of kala-azar and chronic malarial cachexia with frequent fever, types of malarial infection which are exceedingly common in this part of Assam, and which resist quinine given by the mouth in doses up to 40 grains twice or more in the twenty-four hours, I have not had a single case of abscess or ulceration beyond the one referred to. I have used several of the soluble salts of quinine, but I generally use the bi-hydrochloride, which dissolves easily in its own weight of water. I have injected up to 20 grains of this salt at one time, in a 1 in 2 solution.

I also frequently use a solution of ordinary quinine

sulphate made as follows :-

 R. Quinine Sulphate
 ... gr. 160.

 Acid, Tartarie
 ... gr. 80.

 Water to.
 ... oz. 1.

This dissolves readily with the aid of heat, and as I always use it either freshly prepared, or reboiled just before use, there is no difficulty about crystallisation. I generally give 20 minims of this to adults, and 10 or

15 to children.

Before giving an injection, the skin between the shoulder blades, or on the buttock, is well scrubbed with 1 in 20 carbolic lotion. Immediately after filling the syringe with the recently-boiled solution I plunge the needle into a bottle of pure carbolic acid and then thrust it deeply into the tissues. After withdrawing the needle and rubbing in the injection I touch the point of entrance with a camel-hair brush or small swab dipped in pure carbolic acid, and finish the business by an application of carbolic oil.

This method is very similar to that mentioned by Dr. Moffat, of Uganda, in the Journal of Tropical

MEDICINE for October 1st, only that I make use of very much more concentrated solutions of quinine than are generally spoken of as being customary. That quinine may be administered with perfect safety in the way I describe is proved by the fact that several of my native assistants now make use of the method I have taught them, and up to the present I have had no case of abscess formation following upon any injection given by them. I recommend the use of an aseptic syringe, all glass, or all metal, or glass and metal, without either rubber, leather or asbestos plungers. They are far more easily cleaned than any other, are more durable, and are always ready for use. I endeavour to keep one syringe for nothing but quinine injections.

As many of these injections, of highly concentrated solutions, have been administered to patients, the subjects of kala-azar, a condition in which there seems to be a marked predisposition to cancrum oris and other acute septic processes, I consider that my experience is, so far, an absolute proof that the subcutaneous injection of quinine is not, per se, a cause of

abscess formation.

I think it probable, however, that the quinine acts as an inhibitory agent to the phagocytic cells that may be present in the part, and so indirectly cause a lowering of the normal resistance of the tissues to septic processes. It is generally recognised that quinine is not an antiseptic in the strictest sense, and unless the most stringent precautions are taken its administration may be followed by a septic infection occurring in the tissues whose vitality has been lowered by its presence, which would have otherwise been successfully resisted.

No one, I think, who has once adopted the hypodermic administration of quinine for general use, and has witnessed its remarkable efficacy in cases of malarial fever which resist ordinary treatment, would think of going back to other methods of adminis-

tration.

In many cases here quinine given by the mouth, even in extreme doses, is apparently not absorbed in sufficient amount, as cases of cinchonism are the exception, even where it is being taken in doses of 30 grains at a time. In such conditions hypodermic medication is a necessity for economic as well as therapeutic reasons.

RECENT RESEARCHES CONCERNING THE ETIOLOGY, PROPAGATION, AND PREVENTION OF YELLOW FEVER, BY THE UNITED STATES ARMY COMMISSION.

By Walter Reed, M.D. Surgeon U.S. Army, President of the Commission.

From the Journal of Hygiene, April 1st, 1902.

THE efficient control of the spread of yellow fever is a matter of such vast practical importance, both from the hygienic and commercial point of view—not only for the countries where this disease prevails as an epidemic, but also for those in which, after importation, it may assume epidemic proportions—that it has seemed appropriate to bring together in this paper a summary of the work, thus far accomplished by the

United States Army Commission\* on the Island of Cuba, during the years 1900 and 1901, in order that English and Colonial readers who have not, perhaps, had access to the original contributions published in different American journals, may be able to form an intelligent opinion concerning the permanent value of this work. It will also afford opportunity for recording the more recent confirmatory observations made by others concerning the mode of transmission of yellow fever discovered by the Commission, and for calling attention to the results already obtained by the U.S. Army Medical Department in the suppression of this disease, especially in the city of Havana, through the enforcement of sanitary measures based on these later researches.

The American Commission was organised in May, 1900, and began its investigations during the following month (June), being equipped with suitable laboratory facilities for practical work, both at the military garrison of Columbia Barracks, near Quemados, Cuba, and also in the city of Havana. As yellow fever was already prevailing at the time of our arrival in Cuba suitable material for the scientific study of this disease

was immediately available.

#### The Etiology of Yellow Fever.

Before giving the results of our investigations it may be well to recall the situation as regards the etiology of yellow fever at that time. Briefly it may be said that the claims of all investigators for the discovery of the specific agent of yellow fever-since modern bacteriological methods had come into usehad been disproved by the exhaustive observations of Sternberg, published in 1890, except that made by Sanarelli for a small, motile bacillus isolated by him from the blood drawn during life in two of six cases of yellow fever, and from the blood and organs after death in seven of twelve cases of this disease (58 per cent.) studied at Montevideo and Rio de Janeiro. Brazil. The results obtained, however, by those who had promptly undertaken to investigate Sanarelli's claim for the specific character of Bacillus icteroides, seemed to show a lack of agreement such as has never been reported, as far as the writer can recall, in connection with the supposed specific cause of any of the other acute infections. Thus while Achinard and Woodson<sup>3</sup> had, during the epidemic of 1897 in New Orleans, La., isolated a bacillus, claimed by them to be identical with B. icteroides, from the venous blood in 4 out of 5 cases, and from yellow fever cadavers in 32 out of 39 cases (82 per cent.), Portier, working in the same city and during the same epidemic, could only obtain this bacillus three times in fifty-one autopsies, and failed to obtain it at all in cultures made from the venous blood during life in 10 cases. Again, while Wasdin and Geddings,5 in the city of Havana, were able to cultivate B. ieteroides from blood withdrawn from the lobe of the ear, "not earlier than the third day of the disease," in 13 of 14 cases (92.8 per cent.), and to find it in 85.7 per cent. of their necrop-

<sup>\*</sup> The members of this Commission were Major Walter Reed, Surgeon, U.S. Army, and Drs. James Carroll, A. Agramonte, and the late Dr. Jesse W. Lazear, Contract Surgeons U.S. Army.

sies, Agramonte, studying the disease on the Island of Cuba, failed to isolate B. icteroides in a single instance from blood drawn from the lobe of the ear in 37 cases or from the blood drawn from a vein at the bend of the elbow in 31 cases, at various stages of the disease. The latter observer, however, reported finding this bacillus at autopsy in 11 of 35 cases (31.4 per cent.). Without going further into detail, we may say that the results obtained by Lutz and de Lacerda and Ramos in Brazil, and by Matienzo in Mexico, were equally conflicting and unsatisfactory.

Under these circumstances it seemed to the members of the Commission of the first importance to give their entire attention to the bacteriological study of the blood of those sick with yellow fever and of the blood and organs of yellow fever cadavers, having especially in view the isolation of B. icteroides. We were thus able during June, July and August, to take repeated cultures from the blood during life in 18 cases of yellow fever, adopting the usual method employed in withdrawing blood from a vein at the bend of the elbow, and transferring the blood, at once, in quantities of 0.5 c.c. to each of several tubes containing 10 c.c. of nutritive bouillon which were afterwards incubated at 37° C. for a period of one week. In 7 cases, 4 of which were designated as "mild" yellow fever and 3 as "well-marked" yellow fever, only one culture was made from the blood in each case, viz.: in 2 cases on the first day; in 1 case on the second day; in 3 cases on the third day; and in 1 case on the fourth day. In the remaining 11 cases, diagnosed as "severe" yellow fever, of whom four died, more frequent cultures were taken from the blood, these varying from two to six cultures on as many different days of the disease. In two of the fatal cases, cultures were made each day from the commencement of the attack and including the day on which death occurred.

The negative result of these numerous cultures taken from the blood of cases of yellow fever, as regards the presence of *B. icteroides*, was reported in a "Preliminary Note" presented at the meeting of the American Public Health Association, 10 held in Indianapolis, Indiana, October 22nd—26th, 1900. To these 18 cases we can now add 6 other cases, or a total of 24, from which blood cultures have been made during life with negative results.

The importance of this negative finding as regards the growth of any specific bacterium will be better appreciated when it is seen, as I shall soon have occasion to point out, that yellow fever may be produced in non-immune human beings by the subcutaneous injection of a small quantity (0.5—2 c.c.) of blood withdrawn from the venous circulation of a patient suffering with this disease.

In addition to the results above recorded, the careful study of eleven autopsies was equally barren as to the presence of any particular micro-organism, although the quantity of material with which our tubes were inoculated was greater than is usually made use of at autopsies.

In a word, then, the careful bacteriological study which the Commission had made in cases of yellow fever had given no indications as to the presence of the specific agent of this disease. The same may be

said concerning the result of numerous microscopic examinations of fresh and stained specimens of blood which we had in the meanwhile studied with the view of finding possibly some intracellular or extracellular body. Apparently no body, bacterial or protozoan, which could be brought into view with a 12 Zeiss immersion objective, was present in the blood of these

Although displaced from the order in which the following observations were made, it will be best to present, at this time, the results of the experiments which were later carried out by the Commission on non-immune human beings by means of the subcutaneous injection of blood, withdrawn during the active stage of the disease, as these results bear so directly upon the subject which we are now considering, viz., the etiology of yellow fever.

The only reference that I can find in the literature relative to an attempt to convey yellow fever in this way is cited by Sternberg, who states that at Vera Cruz, Mexico, in 1887, he saw Dr. Ruis inject into a non-immune individual a hypodermic syringeful of blood drawn from a case of yellow fever on the eighth day of the disease. The result was negative, as was also the result of two other attempts related to him by Ruis.

Our own observations, undertaken for the purpose of ascertaining whether an attack of yellow fever could be induced in a second individual by the injection of a small quantity of blood, embrace experiments made on twelve American soldiers and Spanish immigrants, all non-immune individuals.

These observations may be divided into the following classes:—

- (1) Injection of the fresh blood taken from a vein at the bend of the elbow.
- (2) Injection of partially defibrinated blood.
- (3) Injection of partially defibrinated blood heated for ten minutes at 55° C.
- (4) Injection of blood-serum previously diluted with sterilised water and filtered slowly through a Berkefeld laboratory filter.

The following Table, I., gives the results of these several inoculations:—

By an examination of this table it will be seen that of the seven individuals who received subcutaneously the fresh or partially defibrinated blood in quantities of 0.5—2 c.c., six (85.7 per cent.) developed an attack of yellow fever within the usual period of incubation of the disease.

These results are of very great interest as demonstrating that the specific agent of yellow fever is present in the blood, at least during the first, second, and third days of the attack.

Another important point brought out by these experiments was that the blood which conveyed the disease did not contain any bacterium which would grow on our usual laboratory media.

In order to establish this fact, as soon as blood had been injected into the non-immune subject, additional blood was at once withdrawn in considerable quantity and transferred to tubes of nutritive bouillon. In one instance, where 2 c.c. of blood had been drawn into the syringe, 0.5 c.c. of this sufficed, when injected, to produce a severe attack of yellow fever, after seventy-

three hours' incubation, while the remaining 1.5 c.c. transferred immediately to four tubes of bouillon gave no growth, except that from one tube we isolated on the fourth day Staphylococcus pyogenes citreus, found by us to be a common skin-contaminating organism in Cuba.

TABLE I.

No. of Case	Quantity and Material Used	Day of Disease	Date of Inoculation	Result	Date of Attack
1	2 cc. fresh blood	Second	Dec. 26, 1900	Negative	-
2	2 cc. ,,	,,	Jan. 4, 1901	Positive	Jan. 8, 1901
3	1.5 cc. "	First	Jan. 8, 1901	,,	Jan. 11, 1901
4	0.5 cc. "	Second	Jan. 22, 1901	,,	Jan. 24, 1901
5	1 cc. ,,	,,	Jan. 25, 1901	"	Jan. 28, 1901
6	O.75 cc. partially defibrinated blood	Third	Oct. 15, 1901	".	Oct. 20, 1901
7	1.5 cc. partially defibrinated blood heated for 10 minutes at 55° C.	,,	Oct. 15, 1901	Negative	-
8	Same as No. 7	,,	Oct. 15, 1901	,,	-
9	,, ,,	,,	Oct. 15, 1901	"	_
10	1.5 cc. of filtered blood serum	,,	Oct. 15, 1901	Positive	Oct. 19, 1901
11	Same as No. 10	,,	Oct. 15, 1901	,,	Oct, 19, 1901
10	(Same as No. 10	,,	Oct. 15, 1901	Negative	=
12	2 cc. fresh blood	Fourth	Oct. 22, 1901	Positive	Oct. 23, 1901

Table I. further shows that the specific agent contained in the blood is destroyed or attenuated by heating the latter at 55° C. for ten minutes, so that the injection of 1.5 c.c. of this heated blood was harmless (cases 7, 8 and 9), while the injection of 0.75 c.c. of the same blood unheated sufficed to promptly induce an attack of yellow fever in a "control" individual (case 6).

Of not less interest was the fact brought out by these observations that yellow fever can be produced by the injection of a small quantity of bacteria-free serum filtrate, obtained by passing the diluted serum through a Berkefeld laboratory filter (cases 10 and 11), and further that the blood of a case of yellow fever, thus produced, when injected into a third non-immune subject will promptly bring about an attack of this disease (case 12), thus demonstrating that the specific agent of yellow fever can find its way through the pores of a filter which ordinarily serves to prevent the passage of all known bacteria.

I have elsewhere<sup>12</sup> in conjunction with one of my colleagues (Carroll) discussed the facts here presented more at length and will limit myself, therefore, to the remark that these experiments appear to indicate that yellow fever, like the foot and mouth disease of cattle, is caused by a micro-organism so minute in size that it might be designated as ultra-microscopic.

The Propagation of Yellow Fever.

Prior to the time at which the foregoing observations were made the Commission had already turned its entire attention to the possible solution of the problem of the propagation of yellow fever, being induced thereto, not only by the fruitlessness of the investigations made thus far along bacteriological lines, but also by reason of certain facts which seemed to call for a better interpretation than had hitherto been accorded them.

Without entering into details, I may say that, in the first place, the Commission saw, with some surprise, what had so often been noted in the literature, that patients in all stages of yellow fever could be cared for by non-immune nurses without danger of contracting the disease. The non-contagious character of yellow fever was, therefore, hardly to be questioned.

In the second place, it had been observed that patients discharged from the wards during early convalescence could be brought into intimate association with non-immune individuals without thereby establishing fresh foci of the disease. This did not seem to indicate that any specific agent was present in the excreta of the sick.

Again, it had been noted that in certain cases of this disease no growth had been obtained on the ordinary laboratory media, either by frequent cultures from the blood during life or from the blood and organs after death.

Further, in the course of an investigation which the Commission were able to make during the last week of July, 1900, concerning the origin and spread of a small epidemic of yellow fever that had appeared in a military garrison, numbering about 900 men, at Pinar del Rio, Cuba, they had seen that by reason of the false diagnosis of "pernicious malarial fever" which had been given to these cases no disinfection of bedding or clothing had been carried out; and yet there was no indication that this neglect had contributed in the least to the spread of the disease: nor had any harm come to those non-immunes who had slept in the beds vacated by the sick, or washed the supposedly infected garments of those who had recovered or died of this disease.

Putting these various data together, it seemed probable that more progress might be made if attention should be turned to the mode of transmission of yellow fever, especially as our own observations had caused us to seriously doubt the usually accepted belief of the conveyance of this disease by means of fomites.

Then, too, the endemic curve of yellow fever in the city of Havana, and its well-known epidemic curve in the United States, appeared to be more intimately associated with and more affected by the rise and fall of the annual temperature curve than was to be seen in any of the acute infections, except malarial fever. The peculiar behaviour of this disease (if I may use the expression) in rapidly spreading in certain localities, when introduced, as contrasted with its failure to propagate itself in other places, where the conditions for its increase were apparently just as favourable, seemed to point in the strongest manner to the neces-

sity for some special agent or intermediate host in the dissemination of its specific cause. If malarial fever—a disease so much affected by temperature conditions—required the agency of a special genus of mosquito for its propagation, as had in recent years been so brilliantly worked out by Ross, Grassi, Bastianelli, Bignami and others, it did not seem unreasonable to suppose that yellow fever—a disease so plainly controlled by seasonal conditions—might also depend on some such agent for its spread. Influenced by this line of reasoning, the Commission began, during the second week of August, 1900, its observations relative to the propagation of yellow fever by means of the bite of a certain species of mosquito—Stegomyia fasciata.

The work along this line was carried forward so rapidly that, within thirty days, eleven individuals had been bitten by infected *Stegomyia*, of whom two\* developed well-marked attacks of yellow fever within the usual period of incubation, and under such circumstances as to positively exclude, in one case, any other

possible source of infection.

Appreciating fully the importance of this discovery and in order to exclude all other possible sources of infection in our future observations, it was now determined to establish a Special Experimental Station where further observations could be made on non-immune human beings, both as to the propagation of yellow fever by means of the bite of the mosquito as well as by exposure to the most intimate contact with infected clothing and bedding, and this under the strictest enforcement of military quarantine. With the approval and assistance of the Military Governor of the Island of Cuba, this Experimental Station was ready for occupancy on November 20th, 1900, and was continuously occupied until March 1st, 1901.

As the results obtained at this station have already been published<sup>13</sup> in full elsewhere, I will here only present a brief account, first of the experiments with fomites and afterwards of those made with infected

mosquitoes.

#### Attempts at Infection by Fomites.

I quote from a paper which the writer presented for the Commission at the meeting of the Pan-American Medical Congress,† held in Havana, Cuba, February 4th-7th, 1901: "For this purpose there was erected at Camp Lazear a small frame house consisting of one room, 14 by 20 feet, and known as 'Building No. 1,' or the 'Infected Clothing and Bedding Building.' The cubic capacity of this house was 2,800 feet. It was tightly sealed within with 'tongued and grooved' boards, and was well battened on the outside. It faced the south and was provided with two small windows, each 26 by 34 inches in size. These windows were both placed on the south side of the building, the purpose being to prevent, as much as possible, any thorough circulation of the air within the house. They were closed by permanent wirescreens of 0.5 mm. mesh. In addition a sliding glass

sash was provided within and heavy wooden shutters without; the latter intended to prevent the entrance of sunlight into the building, as it was not deemed desirable that the disinfecting qualities of sunlight, direct or diffused, should at any time be exerted on the articles of clothing contained within this room. Entrance was effected through a small vestibule, 3 by 5 feet, also placed on the southern side of the house. This vestibule was protected without by a solid door and was divided in its middle by a wirescreen door, swung on spring hinges. The inner entrance was also closed by a second wire-screen door. In this way the passage of mosquitoes into this room was effectually excluded. During the day, and until after sunset, the house was kept securely closed, while by means of a suitable heating apparatus the temperature was raised to 92°-95° F. Precaution was taken at the same time to maintain a sufficient humidity of the atmosphere. The average temperature of this house was thus kept up at 76.2° F. for a period of sixty-three days.

(To be continued.)

#### CLASSIFICATION OF ANOPHELES OF INDIA.

By W. GLEN LISTON.

Captain I.M.S.

A. Palpi unbanded.
I.—A. Lindesaii,
 Tarsi unbanded.
II.—A. Barbirostris.
 Tarsi banded.
B. Palpi banded.

(a) Palpi with four bands.
 I.—A. Pulcherrimus.
 Tips of hind legs white.
 II.—A. Nigerrunus.

Tips of hind legs black.

(b) Palpi with three bands.

(c) Tips of palpi black

(c) Tips of palpi black.
I.—A. Turkhudi.
(a) Tips of palpi white.
I.—Tips of hind legs white.
1. A. Theoboldi.

A. Theoboldi.
 hind tarsal segments white.
 Tibiæ and femora speckled.
 A. Jamesii.
 hind tarsal segments white.

II.—Tarsal joints banded.

A. Stephensi.
 Two equal large white bands on palpi.
 One small band.
 Tibiæ and femora speckled.

A. Rossii.
 Single large white band on palpi.
 Two small bands.
 Tibiæ and femora unspeckled.

Legs unbanded.
 A. Culicifacies.

A. Culicifacies. Only two light spots on wing fringe. Third longitudinal entirely black. Five light spots on costa.

A. Listoni.
 Many light interruptions on wing fringe.
 Third longitudinal mostly white.
 Four light spots on costa.

-Indian Medical Gazette, April, 1902.

<sup>\*</sup> One of these cases was that of Dr. James Carroll, Contract Surgeon, U.S.A., a member of the Commission.

## Current Miterature.

HISTOLOGICAL CHARACTERS OF DELHI BOIL.—At a meeting of this Society held on March 12, 1902, Dr. J. H. McLeod exhibited microscopical preparations of Mr. Morris's case of Delhi Boil. A biopsy was made of one of the lesions, a wedge-shaped piece of tissue being excised, which included the purplish-red, raised border and a portion of the centre. were cut and stained by various methods, and the following microscopical appearances were observed :-The initial change appeared to be a cellular infiltration of the corium, in which the cells were collected in foci around the blood-vessels and sweat-coils on the edge of the lesion, but towards the centre they were more or less diffusely distributed, occupying the whole of the corium from the papillary body to the subcutaneous tissue. The cells composing this infiltration consisted of numerous plasma-cells, connective tissue-spindles, a few mast-cells, and a moderate number of leucocytes; here and there multinucleated cells with eight or ten nuclei arranged in the form of a horseshoe and several large homogenised giant-cells were detected. The blood-vessels were not dilated, but there was a definite proliferation of the endothelium. Where the infiltration was densest the fibrous elements had either completely disappeared or had formed a broken-down network between the cells. In the central area the infiltration showed a tendency to break up with the formation of small irregular cavities. There were no signs of caseation, however, but the cells seemed to shrink and crumble, and be replaced by a granular débris. Leucocytes were more numerous in the central area than towards the periphery. Marked changes, which appeared to be of a secondary nature, affected the epidermis. At the edge of the lesion the pricklecell layer had proliferated irregularly and the pricklecells were enlarged, the basal layer remaining intact; the transitional layers were thickened and a hyperkeratosis was present, which was evident not only on the surface but also by the formation of horny pearls in the deeper parts of the epidermis. These proliferative changes were much less noticeable in the central area, and here and there in this region the epithelium had actually thinned, and the underlying cellular infiltration had amost reached the surface. A cultivation was made from beneath the horny scales, but gave negative results, and only the Staphylococcus epidermidis albus grew. The histological changes exhibited in this case were clearly of the nature of a granuloma with secondary proliferative changes in the epidermis closely resembling those found in tuberculosis verrucosa cutis. The exhibitor hopes to make a further research on the histology and bacteriology of this case, the present sections being shown in order that they might be before the meeting when the case was demonstrated.—British Journal of Dermatology, April,

ERYSIPELAS IN THE NEGRO. REPORT OF A CASE OF THE SO-CALLED SPONTANEOUS TYPE. SUMMARY OF THE LITERATURE ON THE SUBJECT. By Dr. R. P. Stoops.—From the author's case and from the litera-

ture he concludes that the negro possesses no special immunity. The impression prevailing to the contrary is due to the fact that negroes do not apply to the hospitals for treatment, and physicians who have had such cases have not, as a rule, reported them. The onset is attended with enlargement of the cervical glands, sore throat and high fever. The swelling generally begins around the nose or mouth. No cutaneous flush is visible in a very dark negro. Hardened projections can be felt at the periphery of the inflamed area. The blebs are very distinct. Desquamation begins as inflammation subsides, and may be complete in one place while the erysipelatous process is active in another. The general symptoms are those that accompany most of the acute fevers .-American Medicine, February 1st, 1902.

MOSQUITOES AND DENGUE.-Dr. Harris Graham, Professor of Pathology in the American College, Beyrout, Syria, publishes in the Medical Record of February 8th his investigations concerning the parasite of dengue and the possible transmission of the disease by mosquitoes. According to Dr. Graham, the red blood corpuscles of persons suffering from dengue contain a parasite resembling the plasmodium malaria, but its cycle of production is much longer than that of the malarial parasite. Dr. Graham, in a series of experiments, got positive and negative results according as mosquitoes were and were not allowed opportunity of biting infected persons. He believes he has proved that dengue, failing mosquito inoculation, is not a contagious disease, but that the disease is carried by certain forms of culex from one person to another.

It may be Dr. Graham has made a real discovery, and even reasoning by analogy, the transmission of the disease by mosquitoes is highly probable. At the same time we would take occasion to observe that dengue is but an ill-defined disease. During one outbreak the symptoms are pronouncedly of a malarial type, whilst during another they resemble influenza closely. These considerations, however, do not annul the possibility of dengue being a specific ailment, for the symptoms of many diseases mimic those of other complaints and yet are quite apart.

We await confirmation of Dr. Graham's observation with keen interest.

MALARIAL MIXTURE.—Dr. McIntosh recommends the following:—

R. Magnesium sulphate ...  $\frac{1}{2}$  ounce. Solution of ammonium acetate...  $\frac{1}{1}$  ,, Quinine sulphate ... ... 14 grains. Camphor water, enough to make 12 ounces. M.S.—Two tablespoonfuls every four hours.—New

York Medical Journal, December 14th, 1901.

#### PLAGUE.

#### PREVALENCE OF THE DISEASE.

India.— During the three weeks ending March 22nd, 29th, and April 5th, the deaths from plague in India numbered 26,108, 23,286, and 23,834 respectively. These numbers representing the deaths from

plague are more than double those recorded during the corresponding period of 1901. The principal seat of plague at present is the Punjab, where, during the three weeks mentioned above, the deaths from plague amounted to 16,829, 16,675, and 14,871 respectively.

The next most seriously infected area is the Bombay Presidency, where, during the weeks ending March 22nd, 29th, and April 5th, the deaths from plague numbered 3,705, 3,142, and 3,170 respectively. In Bombay during the week ending April 5th, 947 deaths from plague occurred, and in Calcutta 689, both figures showing an increase on those recorded during the week immediately preceding by over 100 cases. In Bengal, exclusive of Calcutta, the returns show that during the three weeks ending April 5th, the deaths from plague amounted to 824, 1777, and 1,256 respectively.

EGYPT.—During the weeks ending April 6th and 13th, the number of plague cases in Egypt were returned as thirteen and twenty-three, and the deaths from the disease during the same periods as nine and thirteen respectively. The Director-General of the thirteen respectively. Sanitary Department complains that at Karachiels, owing to a native official neglecting to report cases of illness, the disease has spread in the immediate

neighbourhood.

In no single town or province of Egypt, however, has plague been allowed to gain a serious hold; and the limitation of the disease to little more than sporadic outbreaks in widely separated districts shows with what vigilance the sanitary authorities are guarding the country from infection.

CAPE OF GOOD HOPE.—After a period of complete cessation from fresh outbreaks of plague lasting some six weeks, it is disappointing to have to report that on April 21st ten cases of plague and five deaths from the disease were reported from Port Elizabeth.

MAURITIUS.—During the weeks ending April 3rd, 10th, 17th, and 24th, the plague returns for Mauritius show the fresh cases as 0, 3, 0, and 0; and the deaths during the same periods as 0, 3, 1, and 0 respectively.

AUSTRALIA.—A telegram from Sydney, April 21st, states that: "Further cases of plague have occurred here, and the disease has appeared among the wallabies at the Zoological Gardens, which in consequence have been closed to the public."

Hong Kong.—During the week ending April 19th seven fresh cases of plague and six deaths from the

disease were reported in Hong Kong.

#### EXCHANGES.

Annali di Medicina Navale. Archiv für Schiffs u. Tropen Hygiene. Archives de Medicine Navale. Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie. Australasian Medical Gazette. Boletin de Medicina Naval. Boston Medical and Surgical Journal. Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology. British Medical Journal. Brooklyn Medical Journal.

Caducée. Climate. Clinical Journal. Clinical Review. Giornale Medico del R. Esercito Hong Kong Telegraph. Il Policlinico. Indian Engineering. Indian Medical Gazette. Indian Medical Record. Janus. Journal of Balneology and Climatology. Journal of Laryngology and Otology.

Journal of the American Medical Association. La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal. Medical Brief. Medical Missionary Journal. Medical Record. Medical Review. Merck's Archives. New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyclinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo. Sei-i-Kwai Medical Journal. The Hospital. The Northumberland and Durham Medical Journal. Treatment.

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## Motices to Correspondents.

1.-Manuscripts sent in cannot be returned.

2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Editors.

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

## The Journal of Tropical Medicine.

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In order to meet the constant enquiry for addresses of respectable firms catering for the various requirements so difficult to obtain abroad, we give a list of names and addresses which we trust will be found useful to our numerous correspondents and subscribers.

## Original Communications.

THE SLEEPING DISEASE (Doenga da Somno).

From the Portuguese.

REPORT SENT TO THE PORTUGUESE MINISTER OF MARINE BY THE SCIENTIFIC COMMITTEE SENT TO STUDY THE SLEEPING SICKNESS IN WEST AFRICA, ON FEBRUARY 21ST, 1901.

#### T.

THE members of the Committee appointed to study the Sleeping Disease in the Angola province, arrived at Loanda on May 30th last, having stopped by the way at Principe island where they stayed from the 7th to the 21st of the same month, and then took up their abode on the Sundy estate, property of Senor Jeronymo José Carneiro, some 157 metres above sealevel.

The disease which rages in the island of Principe under the name of the sleeping disease, according to the information which we were able to collect, is of very old standing, and, according to rumour, was imported from Gabiao by slaves, which, previous to 1799, were transported to these latitudes. The intermarriage of these people, natives of the Congo state, with the aboriginal inhabitants, is the source whence the actual population indigenous to the island of Principe is derived.

Previous to 1887 the number of cases of sleeping sickness was small, and it was only after this date that it increased to the serious extent noted during the last three years.

This increase is without doubt owing to the importation of a great number of labourers from the infested regions of the West Coast of Africa, many dying shortly after their arrival and readily transmitting it to their companions, owing to the very bad conditions of maintenance and accommodation on board the vessel.

We do not think it possible, on this estate, that the disease could be attributed to defective sanitary conditions or to the excess of bodily work. Neither have the labourers the opportunity of smoking "liamba," for the plant does not exist here, nor does it constitute an article of importation. Neither can the abuse of spirituous liquors be made the excuse, as they do not form part of the daily rations, a small portion of red wine only being distributed on Sundays. Of the others, the spirit made from the cocoa tree, and distilled on the estate, may be bought by the labourers, but its sale is stringently controlled. Cases of drunkenness are rare.

Of the different negro races, none are immune from attack. Men and women are without distinction victims of the sleeping disease, but it is stated that previous to 3 years of age cases of the disease are not known; as regards the aged nothing could be investigated, as few of them exist on the estate.

Season seems to have no determining influence upon the spread of the disease.

At the Sundy Estate, on which live nearly four hundred labourers, five to ten cases might be in the hospital at one time, collected from no great distance from each other.

### INFLUENCE OF CONTAGION.

There are reliable data by which it is suspected that the propagation of the disease is due to contact. We shall give an account of two of the most characteristic evidences of this. In the hospital, a woman suffering from sleeping disease was attended by a servant of the name of Jacinto. It was customary for him to go to the hospital every day, bringing the patient's food, which he ate in common with her, to keep her company. When these people take their food in common they eat it by hand out of the same dish, licking their fingers afterwards.

Jacinto shortly after the death of the patient (twelve or fifteen days) manifested the first symptoms of the

sleeping disease whilst on the voyage to Lisbon, and

died in the Hospital of San José.

Three negroes, companions of Jacinto, none of whom visited the hospital, were advised by the Administrator of the island, with the idea of not propagating the disease, that they should abstain from living in intimacy with Jacinto. One of these is at present healthy; the other two were attacked, but with much less intensity; one of the two (which we saw), in spite of all the counsels, continued to frequent Jacinto's house.

The wife and sons of Jacinto, who lived in the same room, never ate in common with the head of the family, according to the custom of their race, and were free from the disease when I saw them a year afterwards.

#### PERIOD OF INCUBATION AND INVASION.

We were not able to gain any positive information concerning the period of incubation of the disease. The attack may occur suddenly with delirium of a furious type; at other times with homicidal tendencies. Generally there is a previous period of bad health, the lower limbs fail in strength, there is loss of appetite, incapacity for work even in those individuals normally of an active nature, and at last sleepiness, accompanied by rachitic pains and occipital cephalalgia.

#### THE DURATION OF THE DISEASE.

In respect to the duration of the disease, we have seen cases run a very rapid course; but the evidence, in the absence of post-mortem examinations or other means of diagnosis, is not quite satisfactory. Generally the individuals attacked do not die before twenty days, the average duration being two to three months, but cases have been known to live for more than twelve months. On the estate all the individuals attacked by the disease died.

#### MORTALITY.

With the view of comparing the death-rate of this disease with the general death-rate, and thus to appreciate the conditions which most influence the excessive mortality of this rich and beautiful island, we asked His Excellency the Governor of the district for use of the respective official documents which exist in the various secretary's offices on this particular subject.

These documents, received by the courtesy of the Governor, referred to the year 1900, and in a population of 4,747 souls there were 833 deaths. The proportion being 175.4 per thousand. The mortality was divided amongst the different races: 12 deaths amongst 178 Europeans (67.4 per 1,000); 821 deaths amongst 4,569 individuals of the negro race (179.6 per 1,000); an exceptionally high death-rate.

The total of the deaths include 48 cases from the sleeping disease, all of the negro race, which gives a percentage of 57.6 per 1,000 for the general deathrate, or more strictly 58.4, as there were 12 deaths amongst the whites, which were not due to the sleeping disease.

This percentage we judge to be below the real deathrate, as among other causes of death, we noticed that anæmia, without any explanation, caused 181 deaths, and some of the deaths in the general statistics attributed to cerebrospinal attacks no doubt belonged to the disease which we are studying.

#### CLINICAL FEATURES.

Of ten individuals of the negro race attacked by the sleeping disease, to which our attention was drawn, we presented a report based on careful clinical examinations, and on two post mortems which we had occasion to perform.

(a) The glandular swelling localised in the mylohyoid region and in the front of the neck, was very marked in various cases in the initial period of the disease. The glandular swellings were indolent, hard and movable under the skin and without tendency to suppurate. In one patient the glandular swellings were absent, but he may have had them some time

previously.

(b) No localised nervous signs or symptoms were observed in the early stages of the disease; but there was always a marked attitude of indifference, and a notable physical depression in one case, to such a degree that it was absolutely necessary to arouse him energetically and repeatedly to wake him up; but once awake it may be noted that his replies to questions were clear. In respect to muscular movements, nothing was observed similar to paralysis or contraction of the limbs, the patient being possessed of the power of all active movements. Sensibility and the muscular sense seemed intact.

In two cases we had occasion to note the existence of muscular trembling of a more or less permanent character. In one of these, the gait took the form of a series of slight jerks, at one time in one group of muscles, and at another time in another group. Generally we found the Faradic sensibility diminished in the anterior tibial muscles and the biceps of the arms.

#### SLEEPINESS.

Sleepiness was not a pronounced feature in the early stages of the disease. The soporific state of two patients, who died during our residence in the island of Principe, did not seem to indicate anything very extraordinary, for a similar state is observed, as a general and final episode, in many diseases of a highly debilitating nature. Impotence in men and amenorrhæa in women were constantly observed.

There were other cases under observation which did not show any symptoms out of the common, saving a slight and notable diminution of arterial tension, and in those cases in which it was possible to measure it, by Potani's instrument, oscillated between

10 and 11.

#### AUTOPSIES.

We made two autopsies, one seventeen hours after death, the other an hour and a quarter after death.

In both cases we found an exudation, more or less of a milky nature under the arachnoid, which showed marked convexity in both hemispheres, invading, in the second body, the upper part of the cerebellum and part of the lateral lobes. This secretion was submitted to microscopic examination and showed the existence of a large quantity of leucocytes and polynuclear leucocytes, with predominance of the former.

On the cerebral vault the milky secretion was diffused, but did not affect the cerebral matter from which the pia mater was easily detached. At other points the effusion went deeper, slightly affecting the pia mater, which became adherent to the visceral layer of the arachnoid. This process of adhesive inflammation, probably of infective origin, existed also in the left cerebral ventricle where the ependyma were adherent a little in front of the fissure of Monro. Neither in the pineal gland nor pituitary body were any abnormal conditions found. The meninges and the spinal medulla were intact, and without any alteration that could be noted by simple ocular observation. In the fluid obtained by lumbar puncture there were found occasionally clots of blood.

The conditions of the improvised laboratory did not permit us to carry on for any length of time very many of these observations, nor could we formulate conclusions other than of a premature nature. But these studies seem to indicate the direction in which we should work in the infectious disease which affects the

labourers on the island of Principe.

This Report is signed by the Chief of the Mission, Annibal Bettencourt, June 9th, 1901.

(To be continued.)

THE DURATION OF THE LATENCY OF MALARIA AFTER PRIMARY INFECTION, AS PROVED BY TERTIAN OR QUARTAN PERIODICITY, OR DEMONSTRATION OF THE PARASITE IN THE BLOOD.

By Dr. ATTILIO CACCINI.

Assistant Physician, Hospital of Santo Spirito in Sassia, Rome; Lancisi Clinique, under the direction of Prof. Giulio Bastianelli.

(Translated from the Italian by St. Clair Thomson, M.D.Lond., F.R.C.S.)

(Continued from page 140.)

### PART II.

ON RELAPSES AT SHORT INTERVALS.

HAVING thus strengthened the importance of the regular quinine treatment in regard to the proportion of relapses in spring tertian, we come to the examination of the relapses, and we will see the importance of the quinine treatment also upon the duration of the latent period.

We have seen that of 145 cases treated systematically and early, there was a relapse in only 37 per cent.; the number of relapses was greater on the eighteenth day of apyrexia (10), and was less at the tenth day (2). It is to be noted that all these patients (138 in 145) were followed for a long time either in or outside the hospital, and that in those who remained there only a short time (seven to forty days) and who had never had the quick relapse during that interval of time, I have proof that it did not even take place outside, even when they had neglected the quinine treatment.

As we shall see in good time the malarial infection was not, however, exhausted, as there was a late relapse (after about two to six months, of apyrexia) in about one-fourth of the cases.

Of these 37 per cent. who had a quick relapse in the hospital, there was a second relapse only in two, who had had the first relapse on the eighteenth day of apyrexia; when the second relapse was cured in the same way the fever did not return again. The latent period between the first and second relapse was shorter than the primary period of latency, i.e., in one it was fifteen days and in the other sixteen days. In five patients I tried to prolong the treatment beyond the seven days, and in only one of these did we have a relapse on the eighteenth day, after which it relapsed again a second and last time on the sixteenth day of the second apprexic period. In certain of the patients followed beyond the forty days there was also relapses, but as they were always after a long interval, they come under another heading.

Of the patients treated systematically but starting somewhat late (and we have seen that they amounted to 301), I would say without going into details that, except for the delay in initiating the treatment, these patients were always treated in the same manner as

those of the first group.

On the whole there was a relapse in 30 per cent. of the cases, with a maximum of 23 cases on the eighteenth day, and a minimum of 1 on the seventh day; the relapses as a whole kept always increasing

from the fifth to the eighteenth day.

In about 200 of the 301 cases followed continuously either in or outside the hospital, we noted that in none of them was there a second relapse at long interval (between two and eight months of apyrexia). Thus, of 9 patients in whom we insisted on the quinine treatment beyond the seventh day (fifteen to twenty-five days), we had a relapse only in 2, and it was late (from the seventeenth to eighteenth day), brief in its duration, irregular, and the fever slight.

Of the 50 patients to whom quinine was given during the febrile acme, there was a relapse in 39 (that is, in about 80 per cent.) between the fifth and the tenth day of apyrexia in continually increasing number, reaching the maximum on the fifth day, and the minimum on the ninth or tenth day of

apyrexia.

The second and third relapse at short interval was very frequent in this group of cases. There was no special behaviour in these relapses, and so I do not give details, limiting myself to saying that the period of apyrexia which elapsed between the one and the other was not constant, that a high and regular fever might succeed to a late and more or less irregular fever in a second relapse, and that concomitant symptoms (nausea, vomiting, headache, &c.), varied without any regular type in every relapse. However, with the administration of quinine in the febrile acme we may say that the relapse anyhow comes very soon, and that it is nearly always constant, and notwithstanding that we insisted on the quinine treatment beyond seven days in four of the cases, all of them had relapses two or three times at intervals of five to eleven days.

Of 55 patients treated with quinine during the sweating period, there were relapses in about 80 per cent., in a proportion always less from the sixth day of apyrexia (12 relapses) to the thirteenth day (1 relapse).

The result of administering the quinine is wellnigh the same whether given during the acme or sweating stage. Thus, for example, a relapse appears in four of these patients in whom the treatment was continued

beyond the seven days.

With the regular daily administration of quinine we showed (as I have already said) the relapse in 55 per cent. between the fifth and the nineteenth day of apyrexia, with a curve at first ascending to the seventh day where it reached the acme (77 relapses), then descending to the tenth or eleventh day (37 cases of relapse), then once more ascending on the twelfth day (42 cases of relapse), and finally descending in a definite way with a minimum of 2 cases on the eighteenth day.

We had then a second relapse and a third in nearly all those who had had the first; besides, in several patients whom I was able to follow for several months both in and outside the hospital, I was able to show a greater or less number of later relapses at short intervals. These appeared as a rule within periods of time which were almost constantly equal for every patient, periods whose duration oscillated between ten

and eighteen days.

In two also of these patients there were febrile outbreaks with extraordinary regularity, in the first case for fifteen days, and in the second for eighteen, and so until the succeeding season, in spite of the continued treatment with 1.50 to 2 grammes of quinine per day.

Of the 291 patients in whom the treatment was carried out altogether irregularly, the relapses were, as I have said, 85 per cent. with a maximum on the sixth day and a minimum between the sixteenth

and eighteenth day of apyrexia.

Besides, in nearly all there was a second and even a third relapse in spite of the treatment. Certain of these patients, although not returning to malarial regions have, however, relapsed at short intervals, and that after a year and a half from the first infection, and also, we repeat once again, in spite of the treatment.

TABLE IX Spring Tertian without Quinine (in which Attacks Dis-APPEARED BY SPONTANEOUS EXHAUSTION).

No. of Febrile Outbreaks before the Exhaustion of the Fever	Duration of the Latent Period Calculated in Days														
EXP C.	No.	5	6	7	8	9	10	11	1	2 18	14	15	16	1	7 18
5	2	1	1		2							,			
7	3	1		1		2			i	• •	•••	1	.:		• •
4	4		1	2	1	1	2	i	1	1		• •	1		1
10	5	1			1	-	2	1		1 2			1		1
11	6			1	1	1	-	3	•••	1	1	.:	• •	1	• •
10	7	1		1	-	2	i	1	i	1	2	1	2		
10	8				1	2	1	1	2		1	1	• •		1
12	9		1	1	1	3	1	i		1	1	1	• •		
10	10	1			-	1	1	2	i	_	1	2	1		
9	11		1	0.7	1	1	1	4	1	1	2	• •			1
10	12	1	-	•	1	• •	1	2	-	2	1				2
9	13		1		1	1	1	1	1	1	1	2			
6	14	1				2		11	1	1	1	1	1	• •	1
		_	_	_	_	_						1	• •	• •	• •
Total per	day	7	5	6	9	15	9	23	8	12	11	9	6	1	7

#### EXPLANATION OF TABLE IX.

These spring tertians had never taken quinine; in them the fever exhausted itself spontaneously; in all, however, there was a relapse. To this group we must add the single case in which, after a certain number of attacks, the fever spontaneously disappeared, without ever having the febrile manifestations up to the present moment. This patient is still free from fever after twenty-seven months from the subsidence of the tertian.

TABLES X. AND XI. sent by the author were incomplete.

#### TABLE XII. .

PATIENTS WITH SPRING MALARIA TO WHOM QUININE WAS ADMINISTERED IN THE VARIOUS PERIODS OF THE FEVER.

Duration of the Latency Calculated in Days																	
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
(A)	5		2	1	4			1			1			4		1	1
(D)	4		3		5				1					6	1	2	1
(C)	3	1	2		4	1			1			1	1	3		2	

#### EXPLANATION OF TABLE XII.

The patients of group (A) were given quinine before the febrile outbreak; the patients of group (B) were given quinine during the febrile acme; and the patients of group (C) were given quinine during the sweating stage.

ON RELAPSE AT SHORT INTERVAL OF SPRING TERTIAN IN PATIENTS WHO HAVE NOT BEEN SUBMITTED TO THE INFLUENCE OF QUININE TREATMENT.

It may be asserted that every spring tertian which is left to itself without the intervention of quinine treatment, after a certain number of more or less regular febrile attacks, will in a certain number of cases present a sudden cessation of these attacks. In other cases the attacks become irregular, or simply increasingly rare, until they finally disappear.

After that we may assert that the relapse is constant after a latency whose duration and character we will study. Only exceptionally does it happen that the attacks do not reappear and that the general condition of the patient improves rapidly; in such the splenic enlargement, the subjective and objective disturbances, and the anæmia diminish and disappear.

I have said exceptionally, since in all of the 120 cases which I was able to follow I was able to note the possibility of such a definite cure in one individual who now, after twenty-seven months of observation, has had no recurrence and in whom I have not been able to detect any signs of malarial infection.

In these tertians, left to themselves, one is able to verify phenomena in regard to which I think it useful to call attention to what is understood by the period of latency. By this name we should denominate the period of apyrexia intervening between the disappearance of the febrile attacks and their reappearance.

This distinction seems opportune, because in spite of apyrexia, and in spite of the improvement of the general condition, the patient does not return to his previous condition of health but remains more or less anæmic. From time to time (three to six days) he complains of vague general symptoms-giddiness, weakness, perspirations, anæmia, gastro-intestinal disturbances of brief duration, neuralgia, &c., without

If we examine the blood of a patient during all this period of apyrexia we observe in it almost constantly the presence of endoglobular parasites which follow a cycle of regular development. As a rule the parasites are scanty, but the phase of development may take place completely. On the other hand they abandon the free forms of "gametes" so very often, that the "gametes" are never solitary but nearly always united two and two, of which one is larger (macrogametes), one is smaller (microgametes); often we can see that

the microgametes put forth flagellæ.

With the development in the blood of the endoglobular forms, and particularly at the period of their greatest development, we can note that they correspond with the periods of disturbance above noticed. In these periods we have also the appearance and the increase of reaction of urobilin in the urine (the quantity of urine sometimes diminishes considerably); these urinary phenomena would tend to prove the destruction of the red globules of the blood. Following this subjective and objective phenomena we can establish that their appearance and increase is in relation with the period of greater development of

the endoglobular parasites.

The period of latency in them is between the maximum of eighteen and the minimum of five days. The end of this period is announced two to three days previously by the disappearance or by the diminution of the endoglobular parasites in the blood; the free forms present nothing new. After two or three days we have the appearance again of febrile attacks which are each in relation with the development of a tertian generation of endoglobular parasites. The attacks may present themselves from the very beginning as typical tertian; sometimes they may be altogether irregular and atypical. That is to say, we can see repeated exactly what takes place in persons who contract malaria for the first time. This, it is well understood, is when the patient has not been submitted to the influence of any treatment, and when placed in hospital and put under regular regimen he is not appreciably under the influence of any cause likely to excite fever.

Of 319 patients of this group I took note also of the number of relapses, as I wish to see if for a given individual the latent period of one of the various relapses was constant, or if we could find any connection more or less constant which would permit us to foresee the duration of the apyrexia, and in consequence the imminence of the relapse. However, the task presented many difficulties, since for many reasons it is not possible to induce patients to remain long in hospital, nor, when once discharged, is it possible to follow the greater number of them. However, I succeeded in following for more than two relapses 21 out of 319 patients, retaining them in hospital for a variable period of four to nine months. In this way I was able to note that in general the patient relapsed several times, and that the period intervening between one and another relapse was not always the same in every case, but varied within the limits of five to eighteen days, even when the patients were subjected to identical conditions of hygiene and

Hence the number, gravity, and quality of the febrile attacks were not equal in every relapse, for it was possible for a relapse, characterised by a brief

succession of regular attacks, to be followed by another characterised by one long succession of most regular attacks with very high temperature.

Only two patients were followed for quite nine months, the first from October to the following June, and the second from September to May. The first had six relapses and the second five.

I here give in tabular form the relapses, their duration, and the duration of periods of apyrexia:-

First Patient (at the first outbreak of the fever he had six attacks).

PERIOD OF OBSERVATION FROM OCTOBER 1ST TO JUNE 3RD.

Relap. Apyr. Relap. Apyr. Relap. Apyr. Relap. Apyr. Relap. Apyr. Relap. 17 dys. 13 dys. 16 dys. 16 dys. 14 dys. 19 dys. 15 dys. 17 dys. 12 dys. 10 dys. 19 dys. Gast, Regu- Gast, Irregu- Head-Vertigo Regu-dist. lar dist. lar ache vomit lar No Irregu- No Regu-dist. lar dist. lar

In this patient there were six relapses through the months from October to March: the maximum duration of the relapses were nineteen days to the third and to the sixth relapse, and a minimum of twelve days at the fifth relapse. There was no regular type of local or general disturbance for each apyrexia period; the relapses were sometimes regular, sometimes not. After six relapses the patient remained well some time, but left the hospital not completely cured, there remained anæmia and splenic enlarge-I heard that on returning to the hills he was again seized with attacks four months after the last relapse which occurred in hospital.

In this patient the duration of the apyrexia periods varied from a maximum of eighteen days at the fourth relapse, and a minimum of ten days at the sixth

relapse.

Second Patient (he had three febrile attacks at the first invasion of the fever).

PERIOD OF OBSERVATION FROM SEPTEMBER 1ST TO MAY 4TH.

Apyr. Relap. Apyr. Relap. Apyr. Relap. Apyr. Relap. Apyr. Relap. 15 dys. 17 dys. 16 dys. 15 dys. 18 dys. 20 dys. 17 dys. 6 dys. 10 dys. 9 dys. No Irregu- No Irregu-dist. lar dist. lar Regu- Vertigo, Regu- Vertigo, Regu-lar naus. lar headache lar

In all, five relapses, which followed a long apyrexia of seven months, after which the patient was lost sight of. The maximum duration of the relapses was twenty days in the third relapse; the minimum was six days at the fourth relapse. The apyrexia lasted between eighteen days before the third relapse and ten days before the fifth; there were no special disturbances except vertigo, headache, and on two occasions, nausea. The fever was typical tertian for the first four relapses, only the fifth was irregular.

In these two patients, who were of the same age and occupation, the constitution was equally robust. They were under observation during a sufficiently long time at the same date; they were treated with the same diet and method of life; and they were forbidden to leave their beds.

The relapses in both occurred without special determining causes; they did not suffer cold nor damp, and they had no gastro-intestinal disturbances, except the nausea and vomiting a few hours before the febrile attacks; but these disturbances were not constant;

there were no intercurrent affections during the period of observation. The observations were identical in the 19 other patients in whom we were able to study more than two relapses, hence I do not think it necessary to discuss them at length. I would only say that I was able to note in these 21 patients that the relapses occurred more frequently during the spring than during the winter months. I verified this in all the 120 patients of this group; in fact, many of them who had no fever in the autumn, relapsed regularly in the spring. The maximum of relapses was from March to May; moreover, these observations of mine coincide with all authors who have studied Recent observations carried out most scrupulously have proved this in a definite manner.1

#### (3) SUMMARY.

Summarising the results obtained from the tables and the facts cited, we may conclude that:-

(A) In patients submitted systematically to quinine

at the first outbreak of fever :

(1) The relapse with short interval only occurs in 37 per cent. of the cases, that is to say, they offer the

lowest proportion of relapses.

(2) The relapse at short interval is only a single one, since in only 2 cases were there two relapses, that is, it would occur in 1.5 per cent.; in such a case the relapse is shorter.

(3) The relapse at short interval is more frequent towards the nineteenth day, occurring on that day in

about one-quarter of the cases.

(4) By prolonging the treatment beyond the seven days, the relapse occurs all the same (in each case the fever relapsed on the eighteenth day for the first time, and on the sixteenth day for the second), hence one may probably conclude that the prolonged quinine treatment has no influence, neither preventing nor retarding the relapse in spring tertian.

(B) In individuals systematically treated after they have already had some febrile attack, analogous in other conditions to those mentioned under (A):

(1) The relapse at short interval only occurs in 30 per cent. of the cases, and the patients treated in this way present the lowest proportion of relapses.

(2) The relapse is more frequent between the fifth and the eighteenth day, and reaches its maximum on

the eighteenth day (it occurred in 23 cases).

(3) There is no second relapse, or at least very rarely, opportunity never having arisen to us to study any such case.

(4) The prolonged quinine treatment has no influence, neither preventing nor retarding the relapse.<sup>2</sup>
(C) With the regular daily administration of

quinine :-

- (1) We have relapse in 15 per cent., with two maxima, one at the seventh and the other at the twelfth day, the minimum at the eighteenth day.
- (2) The second and third relapses are the most frequent.
  - (3) In the case of more than two relapses the

intermediate apyrexial periods were often of equal duration for every patient.

(4) By insisting on the quinine treatment these

data do not vary.

(D) With the quinine administration during the acme and during the sweating, the relapse occurred :-

(1) In 39 cases in 50, that is, in nearly 80 per cent., that is these patients furnish a proportion of relapses

far higher than the preceding categories.

(2) The relapse at short interval appeared even earlier than with the other methods of quinine administration, reaching the maximum proportion on the fifth and sixth day, and the minimum on the ninth and thirteenth day.

(3) The second and third relapses at brief interval,

were the most frequent.

(4) By insisting on the quinine treatment beyond five days the relapse is equally frequent, and so indeed are the second and third relapses.

(E) In the patients treated in an irregular way:

(1) The relapse is more frequent in the early days than towards the eighteenth day, the period of latency being maintained in a duration of five to eighteen

(2) The relapse at short interval occurs in 85 per cent., that is, these patients present a proportion of

relapse still higher.

(3) More relapses occur in the same individual.

(4) The insistence on the treatment does not influence the recurrence more or less of the relapses.

(5) These patients, like some of those treated with quinine in the acme and during the sweating, and like those treated with quinine regularly every day, can have relapses at short interval, atypical, for months, and sometimes for years.

(F) In the spring tertians without quinine:

(1) The spring tertian can exhaust itself definitely but only very rarely, in the greater number it remains latent; this period of short latency is of the minimum duration of five days, and maximum of eighteen days; the maximum of relapses occurs between the ninth and eleventh day of apyrexia from the spontaneous

cessation of febrile attacks. (2) We can have disturbances more or less vague, not associated with fever, between the third and sixth day of apyrexia, disturbances which for other reasons (examination of blood, urinary examination) can be perhaps attributed to abortive febrile attacks.

All this consequently permits us to suppose that as a rule the period of latency between the various relapses may be brief, and also that if we would consider as abortive attacks the local and general disturbances, such a period can often arrive only at the three days. However, given the constant fact that the examination of the blood is always negative, two or three days before the outburst of fever, and only then while during the so-called disturbances that does not occur, we may limit ourselves to considering as symptoms of relapse only those which are associated with a rise of fever, and limit the period of latency between the fifth and eighteenth days; that is, however, remembering that the relapse is always easier between the ninth and the eleventh

(3) These patients furnish the greatest proportion

<sup>&</sup>lt;sup>2</sup> Probably when the quinine treatment is applied after some fever, the remedy acts upon a generation of parasites, probably less resisting, and hence such a systematic quinine administration a little retarded gives the best therapeutic results.

of relapses to the relapse at short interval. In these patients the relapse is repeated after a period of time which may not be the same in each one although in the same individual, but always manifesting itself in the given period of five to eighteen days.

(4) The relapse at short interval is more frequent in the spring and chiefly between March and May, but without the period of latency indicating any

influence in its duration.1

### CHAPTER 2.—QUARTAN FEVER.

I have placed before all observations those carried out on spring tertian in relation to the period of latency in the relapses at short interval. In speaking of quartan and of malignant tertian, I will refer briefly to many of the factors minutely described under spring tertian. In the exposition of the facts relating to quartan I will maintain the same arrangement that I have followed so far; that is, following the conception of the quinine administration, I will demonstrate the results, adding one by one all the observations in relation to the provocative changes of the relapse, as I have done with the spring tertian.

As we have seen previously, the cases of quartan I have studied amount to 155, distributed as in Table

No 1.

Of these only 55 were of the triple form of quartan and 100 of the double form.

#### (1) QUARTAN SUBMITTED TO QUININE TREATMENT.

All the patients with quartan treated with quinine, when under good hygienic conditions, remained immune to relapse at short intervals so long as they remained in these conditions, and there was no difference in them with reference to the method in which the quinine was administered. I do not reproduce, however, the figures which indicate the number of these patients divided in groups, as I did for the spring tertians; I limit myself only to saying that of each group some were followed for three or four months without presenting any pathological manifestations. It would result, however, from my observations that the quartans submitted to quinine treatment, if they maintained themselves in good conditions of life, did not relapse at short intervals. However, that is always in patients treated in hospital, or who, in their own house, can maintain the same care as at the hospital. I can assert that there was no difference of any sort in reference to age or sex.

(To be continued.)

METHYLENE BLUE IN MALARIA.—A de Blusi, in the Gaz. de Ospedali (Milan) of March 16th and 23rd, 1902, states that he treated 100 cases of malaria with methylene blue in doses of from 20 cg. to 2 grms. in the twenty-four hours. He claims cures in sixty-two of the cases recorded by this treatment. Blusi warns practitioners against administering methylene blue during pregnancy.

PREVAILING DISEASES IN BRITISH HONDURAS.—Like all other Central African countries, British Honduras has its share of malaria, the most prevalent disease. The lowlands along the coast are the breeding-places of the plasmodium. Many of the residents, foreign and native, who have lived for several years in malarial districts show plain indications of chronic malarial poisoning. The pernicious form and that complicated by hæmaturia are occasionally met; the quotidian type is the most common.

Yellow fever has never had its origin here; the several epidemics which have scourged the country at different times could always be traced to cases coming from Cuba, Port Limon, or South America,

more especially Colon.

Tuberculosis is prevalent among the Indians, Caribs, and half-breeds. The lungs are most frequently the primary seat of the disease, but glandular, bone and joint tuberculosis are by no means rare. The mixture of races has here, as elsewhere, been a potent element in the rapid dissemination of the disease.

Pneumonia and rheumatism are most common during

the rainy season.

Dysentery and diarrhea occur at all times of the year, and to them must be attributed the frightful infantile mortality. The frequency of intestinal disorders can be accounted for by improper food, inadequate clothing, exposure to rain, prolonged heat, and high atmospheric humidity. The maximum shade temperature is about 90° F., minimum, 56° F.

Whooping cough invaded the colony in October, 1898, has continued to prevail from time to time, and has contributed largely to the mortality of infants, and raised the death-rate from respiratory diseases.

Typhoid fever is a very rare disease here as elsewhere in Central America. The rarity of the disease in Belize may be attributed to the water supply, as this is on the "separate" system, that is, to a considerable extent each house has its supply from a separate vat, the water being rain-water collected from the roof. A few years ago there were four cases of leprosy in British Honduras; at present only one.

Anchylostoma was reported for the first time in the colony in 1898. Since that time it has been frequently observed. I was given an opportunity to examine two cases in the Public Hospital. In both instances the disease was characterised clinically by puffiness of the face and pronounced anæmia. In Corosal "it was observed in selected cases that this worm was almost invariably present, associated with ascaris lumbricoides and oxyuris vermicularis"; and in Orange Walk the medical officer reports: "It is frequently encountered, and is responsible for much of the anæmia prevalent among the Indian population" (Eyles).

Cases of beri-beri are occasionally seen, both imported and indigenous. One case of this disease, the paralytic form, is in the public hospital at the present time. The patient is a woman of middle age. The muscles principally involved are the extensors of the hand and fingers.—N. Senn, M.D., Jour. Amer. Med.

Assoc., April 26th, 1902.

<sup>&</sup>lt;sup>1</sup> The intervention of other factors which we call accidental, may abbreviate in particular cases the duration of the period of latency.

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THE

## Journal of Tropical Medicine

May 15, 1902.

### HOSPITAL ADMINISTRATION THE CROWN COLONIES AND PROTECTORATES.

In our Colonies and Protectorates we have many Hospitals, some of them of great size, excellently administered and equipped. For the most part they are under the management of medical men who not only treat the sick but are responsible for the administration and organisation of these large establishments. In our civil hospitals in Britain medical men are merely the surgeons and physicians; they are not concerned in the working of the hospital, nor, in fact, are they expected or allowed to take part in so doing. The administration, organisation and equipment, even the superintendence of the nursing staff is in the hands of a lay committee representing the subscribers and donors to the Hospital Funds.

One of the reasons why medical men in Britain are thus shut out from the management of the hospitals to which they are attached, is no doubt owing to the fact that they have no training in hospital management, and do not interest themselves in the matter. It appears incongruous, but it is so, that the medical staff of a purely medical institution should be under the control of laymen, and what would seem surely part of a medical man's duties, namely, the working of our hospitals, is conducted by a body of men who know nothing of medicine or its actual requirements. The position of the staff is sometimes but only sometimes—so interfered with, that the lay committee may actually reject for a surgical or medical appointment, a candidate selected and recommended by the medical and surgical staff. The cause of this anomaly in civil hospitals in Britain is no doubt owing to the fact that the public supply the money, and they consider, and justly too, that they have a right to know how the moneys subscribed by the public are disposed of.

In our civil hospitals connected with the Colonial Medical Service it is the principal medical officer who is responsible for the organisation and administration of the hospital for the most part. He is almost in the same position as the naval or military medical officers in charge of hospitals, being at once the medical head and the administrator of the establishment with which he is connected.

One naturally asks what training in hospital administration have the members of the Colonial Medical Service when they join. In the Army and Navy this branch of service is regarded as one of the most important, and it is necessary to have theoretical and practical training, and to pass examinations of a searching character in hospital administration before taking charge of a hospital. In no branch of work have the medical officers of the Army gained greater credit, in the opinion of the civil medical men who worked with them or under them in South Africa, than in their power to administer and organise. Even quite junior officers of the R.A.M.C. astonished all the civil consultant surgeons and physicians attached to hospitals at home, in the efficient and "business-like" way they provided for and superintended the camps, field hospitals, &c., during the time of war. Many of the older and more experienced civil surgeons whilst in South Africa resented their hospitals being under the control of a junior Captain or a Lieutenant of the R.A.M.C.; but they soon saw that this officer, junior though he was, proved to be their superior in knowledge of how to administer a hospital, and they were bound to humbly submit to the régime, owing to their own lack of acquaintance with the subject. The handle the military officer had was that he had been practised, trained and examined in how to administer.

In the Civil Hospitals in our Colonies the medical officer gathers, as years advance, experience which fits him to be in charge of a hospital when the time comes for him to take over the duties. This experience, however, gives him only a knowledge of the local requirements; a useful and necessary knowledge no doubt, but it is a knowledge gained after the fashion of a housewife —useful but local, and may be good and economic or bad and extravagant. This should not be; hospital administration ought to form part of every medical man's training, but especially of officers about to join the Colonial Medical Service, or about to become members of that most useful and commendable section of our profession, medical missionaries. Mission hospitals are, perhaps, more completely under the management and control of medical men than are any other hospitals, be they civil, naval or military, at home or abroad, and there are no more economically managed hospitals in the world; nor any in which so much good is got out of a small amount of money. Doctors can become "business" like, and are to be implicitly relied upon as administrators, but it is not fair to ask them to assume this great responsibility without an education in hospital organisation. Such training would be a great boon to the doctors themselves, to the service or society to which they belong, and for the economy and welfare of the hospital over which they have control.

The London School of Tropical Medicine could not do better than set the example, and institute a course of technical training in hospital administration. By so doing they would bestow direct benefit upon our civil and missionary hospitals in our colonies and possessions, and indirectly, perhaps, stimulate other educational bodies to follow their example, so that medical men might be trained in a branch of their work which they have neglected, but which surely is peculiarly their own.

#### NAVAL MEDICAL SERVICE.

SR,—I gather from your letter in the British Medical Journal that you invite criticism on the Naval Medical Service.

(1) As to your remarks regarding marriage of naval surgeons, it is financial suicide; they have to keep up the full expenses of a ward-room mess in addition to wife's household. In this and every other matter the R.A.M.C. compares favourably.

(2) The pay of naval surgeon, whether at home, up the Persian Gulf, or West Africa, is the same; here, again, the R.A.M.C. scores in getting Indian and Colonial allowances.

(3) There is no *charge* pay for naval surgeons, though it is given to every other grade in Navy—executive, engineer or paymaster.

(4) The naval surgeon is only given relative (with but after) rank of lieutenant for twenty years. This is practically the whole service of the bulk of men who enter. Imagine a man who may be nearly 48 years of age ranking with lieutenants for choice of cabin, &c.

(5) Numbers of naval surgeons never join a hospital during their service. How can a man keep au courant with modicine and surgeons?

with medicine and surgery?

(6) Boiled down, the new warrant gives 3s. a day extra pay, and nothing else, and the half-pay is left as before. And the day a man ceases to be borne on a ship half-pay begins.

As an improvement in their position, naval surgeons

have for some years asked :-

(1) For promotion to staff surgeon in eight years. For promotion to fleet surgeon in sixteen years.

(2) For charge pay at same rates as is granted to other branches (executive, engineers and paymasters).

(3) That after each commission a surgeon shall pass not less than three months at one of the large naval hospitals (Haslar, Plymouth, Chatham), or at a metropolitan hospital, before proceeding on a fresh cruise.

It is the general opinion that, unless these very moderate concessions are granted, young medical men will do better in the R.A.M.C. or out of the Services altogether.

Yours, &c.,

R. N.

#### A COLONIAL MEDICAL SERVICE.

April 3rd, 1902.

SIR,—We, the undersigned Medical Officers belonging to the Colonial Medical Service, having read with much interest a leading article in the JOURNAL OF TROPICAL MEDICINE for December 2nd, 1901, on the

subject of a proposed Medical Service for the Colonies and Protectorates, and having noted that medical men in the Crown Colonies and Protectorates are invited to express their opinions on the scheme formulated by the Crown Colonies and Protectorates Medical Service Committee, are glad to have an opportunity of expressing our entire sympathy and accord with the proposal that a Colonial Medical Service be formed. The details of the scheme, as set forth by the Committee, are in accordance with our views.

With regard to pay, we are of opinion that regular increases of salary should be given according to seniority, and that the actual salaries should not vary in the different Colonies and Protectorates, but that especial allowances should be given to those serving in places known to be unhealthy. For this purpose the various Colonies and Protectorates should

be graded according to climate.

The question of leave has not been dealt with in the draft scheme. The local leave regulations, under which no leave beyond three months' full pay leave can be taken until the completion of six years' service, are in our opinion unsuitable, inasmuch as there is no doubt but that six years is too long for a European to remain in a purely tropical country without a change of climate. We would recommend that eight months' full pay leave be granted in respect of every four years' service in a healthy tropical climate.

With regard to pensions and gratuities we entirely agree with the suggestions of the Committee. The local pension regulations, under which no pension can be taken until an officer has served for thirty-five years or is fifty-five years of age, practically means that few officers will ever live to earn a pension.

We have the honour to be, Sir,

Your most obedient servants,

[Signed by four Officers of the
Colonial Medical Service.]

The Editor, The Journal of Tropical Medicine.

#### SLEEPING SICKNESS IN UGANDA.

APPOINTMENT OF A SCIENTIFIC EXPEDITION.

UNDER the auspices of the London School of Tropical Medicine an expedition is to start early in June to study and report up the development of sleeping sickness in districts in and around Uganda. The members of the expedition consist of: Dr. Castellani, bacteriologist; Dr. Christy, epidemiologist; and Dr. George Lord, parasitologist. Dr. Lord is in charge of the expedition. The advent of sleeping sickness in this region of Africa is quite recent, as we have mentioned several times in previous issues of the Journal, and the serious nature of the disease may be gathered from the fact that in the Busogo district alone 20,000 persons are reported to have died recently from sleeping sickness, and in the district of Chugwe the mortality from the same cause is reported to be heavy. Until a year or two ago sleeping sickness was regarded as a curiosity, but seeing that the disease and its "accompanying" parasite, the filaria perstans, have both crossed from the water-shed of the Congo to that of the Upper Nile, and that the disease is showing a virulence hitherto uncredited, it would appear as if sleeping sickness were about to become a veritable scourge. The funds for the expedition have been provided by the Royal Society and the Foreign Office.

RECENT RESEARCHES CONCERNING THE ETIOLOGY, PROPAGATION, AND PREVENTION OF YELLOW FEVER, BY THE UNITED STATES ARMY COMMISSION.

By Walter Reed, M.D.
Surgeon U.S. Army, President of the Commission.
From the Journal of Hygiene, April 1st, 1902.

(Continued from page 146.)

"November 30th, 1900, the building now being ready for occupancy, three large boxes filled with sheets, pillow-cases, blankets, &c., contaminated by contact with cases of yellow fever and their discharges were received and placed therein. The majority of the articles had been taken from the beds of patients sick with yellow fever at Las Animas Hospital, Havana, or at Columbia Barracks. Many of them had been purposely soiled with a liberal quantity of black vomit, urine, and fæcal matter. A dirty 'comfortable' and a much-soiled pair of blankets, removed from the bed of a patient sick with yellow fever in the town of Quemados, were contained in one of these boxes. The same day, at 6 p.m., Dr. R. P. Cooke, Acting Assistant Surgeon, U.S.A., and two privates of the Hospital Corps, all non-immune young Americans, entered this building and deliberately unpacked these boxes, which had been tightly closed and locked for a period of two weeks. They were careful at the same time to give each article a thorough handling and shaking, in order to disseminate through the air of the room the specific agent of yellow fever, if contained in these fomites. These soiled sheets, pillow-cases and blankets were used in preparing the beds in which the members of the Hospital Corps slept. Various soiled articles were hung around the room and placed about the bed occupied by Dr. Cooke.

"From this date until December 19th, 1900, a period of twenty days, this room was occupied each night by these three non-immunes. Each morning the various soiled articles were carefully repacked in the aforesaid boxes, and at night again unpacked and distributed about the room. During the day the residents of this house were permitted to occupy a tent pitched in the immediate vicinity, but were kept in

strict quarantine.

"December 19th those three non-immunes were placed in quarantine for five days and then given the liberty of the camp. All had remained in perfect health, notwithstanding their stay of twenty nights amid such unwholesome surroundings.

"During the week December 20th—27th the following articles were also placed in this house, viz., pajamas suits, 1; under-shirts, 2; night-shirts, 4; pillow-slips, 4; sheets, 6; blankets, 5; pillows, 2; mattresses, 1.

These articles had been removed from the persons and beds of four patients sick with yellow fever and were very soiled, as any change of clothing or bed-linen during their attacks had been purposely avoided, the object being to obtain articles as thoroughly contaminated as

possible.

"From December 21st, 1900, till January 10th, 1901, this building was again occupied by two non-immune young Americans, under the same conditions as the preceding occupants, except that these men slept every night in the very garments worn by yellow fever patients throughout their entire attacks, besides making use exclusively of their much-soiled pillow-slips, sheets and blankets. At the end of twenty-one nights of such intimate contact with these fomites, they also went into quarantine, from which they were released five days later in perfect health.

"From January 11th till January 31st, a period of twenty days, 'Building No. 1' continued to be occupied by two other non-immune Americans, who,

individuals who were lodged in tents in a separate part of the camp, were being subjected, with their full consent, to the bites of mosquitoes which had previously fed on the blood of cases of yellow fever occurring in the city of Havana. Thus, during the period from December 5th, 1900, to February 7th, 1901, we had subjected to this method of infection twelve non-immune subjects, who had previously passed their full record of quarantine in this camp. Of these ten, or 83·3 per cent., experienced attacks of yellow fever and always within the period of incubation of this disease.

The following Table II. gives the necessary data

concerning these observations.

The positive results obtained, therefore, by this mode of infection, stand in striking contrast to the negative experiments made with *fomites*. Indeed, cases 8 and 9 of Table II. had each slept twenty-one nights in the garments of yellow fever patients while occupants of Building No. 1. As they had remained

TABLE II.

No. of Case	Days in	INOCULATION		Method of	Period of Incubation	Result	Order of Occur-	Date of Occurrence		
	Quarantine	Honr	Date	Inoculation	in Hours	Result	rence	Date of Occurrence		
1	15	2 p.m.	December 5, 1900	Mosquito	811	Positive	1	December 8, 1900.		
2	9	4 p.m.	,, 8 ,,	,,	137	,,	3	,, 13 ,,		
3	19	10.30 a.m.	,, 9 ,,	1,	831	,,	2	., 12 ,,		
4	21	4.30 p.m.	,, 11 ,,	,,	$91\frac{1}{2}$	,,	4	,, 15 ,,		
5	32	12 noon	,, 21 ,,	,,	95	,,	5	,, 25 ,,		
6	31	10 a.m.	January 8, 1901	,,,	-	Negative	6	-		
7	22	11 a.m.	December 30, 1900	17	$94\frac{1}{2}$	Positive	7	January 3, 1901.		
8	69	8.30 p.m.	January 19, 1901	,,	$95\frac{1}{2}$	,,	8 .	,, 23 ,,		
9	74	10.30 a.m.	,, 25 ,,	,,	- '	Negative	9	+ 7		
10	6 -	9.30 a.m.	,, 31 ,,	3,	$74\frac{1}{2}$	Positive	10	February 3, 1901.		
11	78	11 a.m.	February 6 ,,	33	78	,,	11	,, 9 ,,		
12	25	2 p.m.	,, 7 ,,	,,	70	,,	12	,, 10 ,,		

like those who preceded them, have slept every night in the beds formerly occupied by yellow fever patients and in the night-shirts used by these patients throughout the attack without change. In addition, during the last fourteen nights of their occupancy of this house they had slept each night with their pillows covered with towels that had been thoroughly soiled with the blood drawn from both the general and capillary circulation, on the first day of the disease, in the case of a well-marked attack of yellow fever. Notwithstanding this trying ordeal these men have continued to remain in perfect health.

"The attempt which we have therefore made to infect 'Building No. 1' and its seven non-immune occupants, during a period of sixty-three nights, has proved an absolute failure."

#### Infection by Mosquitoes.

While the experiments with fomites were being carried out in "Building No. 1," certain non-immune

in perfect health at Camp Lazear for yet thirty days longer, they were at the expiration of this time bitten by infected mosquitoes solely for the purpose of testing their immunity and with the result that an attack of yellow fever promptly followed in each case.

It should be borne in mind, also, that of the nonimmune residents at Camp Lazear, while all lived under the same hygienic conditions, only those individuals developed yellow fever who were purposely bitten by contaminated mosquitoes, or injected with the blood of those sick with this disease. Moreover, the precision with which the infection of the individual followed the bite of the mosquito left nothing to be desired in order to fulfil the requirements of a scientific experiment.

Case 5 of Table II. is of especial interest, when taken in connection with the failure to induce the disease by contact with *fomites*.

This individual, having been quarantined for thirtytwo days at Camp Lazear, volunteered to enter a newly-erected building in which fifteen contaminated mosquitoes had just been freed. His first visit was at noon, December 21st, 1901, and the length of his stay thirty minutes. At 4.30 p.m., the same day, he again entered this building and remained twenty minutes. The following day, at 4.30 p.m., he, for the third time, visited this room and remained twenty minutes. During each of these visits he was bitten by mosquitoes. He did not enter the building again, nor was he exposed to any other source of infection. Nevertheless, at the expiration of three days and twenty-three hours, or at 6 a.m., December 25th, 1900; he was suddenly seized with an attack of yellow fever, which proved to be severe in character. That the infection was occasioned by the bites of contaminated mosquitoes was plainly shown by the immunity from the disease enjoyed by two non-immunes "controls," who, protected only by a wire-screen partition, had been present at each of the subject's visits and who, under the same conditions of security against the bites of the infected mosquitoes, continued to sleep in, and breathe the common atmosphere of this room for yet eighteen nights.

To the positive cases contained in Table II, which were produced at Camp Lazear, we are now able to add four other cases of yellow fever occasioned by the bites of infected mosquitoes, thus making a total of 14 cases, in each of which happily recovery followed.

A very important point brought out by these observations is that an interval of about twelve days or more after contamination appears to be necessary before the infected Stegomyia is capable of conveying the disease to a susceptible individual. experiments made with insects which had bitten yellow fever patients two to ten days previously were always negative, although these same insects were proven capable of conveying the disease after having been kept until seventeen to twenty-four days had elapsed. Our observations<sup>14</sup> further demonstrate that mosquitoes that have been kept for periods varying from thirty-nine to fifty-seven days after contamination are still capable of conveying the disease, and further that infected Stegomyia may survive for a period of at least seventy-one days. This will explain how the contagion of yellow fever may cling to a building, although it has been vacated for a period of two or more months.

Bearing in mind that the observations made by means of blood injections (Table I.) were only undertaken after we had succeeded in demonstrating that the disease could be conveyed by the bites of the infected Stegomyia, it will be seen that our study of the method of propagation of yellow fever at Camp Lazear sufficed to prove very definitely that, while the natural mode of transmission of this disease is through the bites of infected mosquitoes, yellow fever may also be conveyed, like malarial fever, by the injection of a small quantity of blood taken from the veins of an individual suffering with this disease.

Per contra, our observations show that, notwithstanding the common belief in this mode of transmission, yellow fever cannot be induced in the non-immune individual even by the most intimate contact with contaminated articles of clothing and bedding. Although the investigations made at Camp Lazear were only concluded one year ago, already confirmatory evidence of the strongest character has been furnished in a series of experiments carried out by Guitéras, <sup>15</sup> at the Inoculation Station of the Sanitary Department of Hayana.

I may be pardoned for quoting the paragraph with which Guitéras begins his contribution. He says: "The favourable results obtained by the United States Army Commission in their experiments with yellow fever, the continued series of mild cases resulting from these experiments without a death, suggested very naturally the continuation of their work on a larger scale; not with a view to control or confirm the conclusions of the Commission, for anyone who had followed their work with unprejudiced attention must have concluded that their solution of the problem of the etiology of yellow fever was final; but rather in the hope of propagating the disease in a controllable form, and securing amongst the recently arrived immigrants immunisation, with the minimum amount of danger to themselves and the community."

Of a total of 42 individuals inoculated by Guitéras 25 were rejected by him by reason of having been bitten by insects that had been applied to cases of fever about which the diagnosis was in doubt. The following table, therefore, only includes 17 persons who were bitten by Stegomyia that had previously fed on unmistakable cases of yellow fever at intervals of fourteen to thirty-six days before being applied to the non-immune subject.

TABLE III.

No. of Case	Date of Inoculation			ion	Mode of Inoculation	Result	Period of Incu- bation		
1			1901		Mosquito	Positive	3 days, 10 hours		
2	Aug.	4	,,		,,	Negative	_		
3	,,	4	,,		,,	,,	-		
4 5	,,	7	,,		,,	T !!.	1 71		
	,,	8	,,		,,	Positive	4 days, 5 hours.		
6	,,	8	,,		,,	», »,	3 ,, 3 ,,		
7	,,	7	,,	• •	,,	Negative	- 01		
8	,,	9	,,		,,	Positive	5 days, 3 hours.		
9	,,	10	,,	••	"	Negative	_		
10	,,	10	,,		,,	,,			
11	,,	10	,,		,,	D ?!.	0.1 101		
12	,,	13	,,		,,	Positive	3 days, 19 hours.		
13	,,	13	,,		,,	Negative	0.1 011		
14	,,	14	,,		,,,	Positive	3 days, 21 hours.		
15	,,	14	,,		,,	,,,	5 ,, 21 ,,		
16	,,	22	,,		**	,,,	3 ,,		
17	,,	24	,,		,,	Negative			

A more complete confirmation of the results obtained by the American Commission could not be furnished than the data contained in the foregoing table, since they show that of 17 individuals who were bitten by infected Stegomyia fasciata, 8 (47 per cent.) developed the disease. Most unfortunately in three of these cases very grave symptoms ensued, such as black vomit and suppression of the urine, which eventuated in the death of the patients. I may add that in the hands of Guitéras fomites fail to exert any effect on non-immunes.

Whether other species of mosquitoes than Stegomyia are capable of conveying the parasite of yellow fever has not as yet been determined by the Commission;

nor have we been able to ascertain whether the parasite passes from the mother insect to daughter insects. The experiments which we have thus far been able to make for the purpose of determining these important points, although negative, have been too few in number to warrant any definite expression of opinion.

# The Prevention of Yellow Fever.

The definite determination of the way in which yellow fever is transmitted from the sick to the well, furnishes a solution at last of that much vexed problem of how to prevent the spread of the disease. Even in the absence of more definite knowledge concerning its specific agent-knowledge greatly to be desired from a scientific standpoint—we are now able. as sanitarians, to direct our efforts along certain welldefined lines, with a feeling of security heretofore unknown.

From the point of view of prevention the situation may be briefly summed up in the following conclusion, which was presented by the American Army Commission to the Pan-American Congress of 1900\*, viz.: "The spread of yellow fever can be most effectually controlled by measures directed to the destruction of mosquitoes and the protection of the sick against the bites of these insects."

This conclusion was the logical outcome of the observations that had been made by the Commission at its Experimental Station near Quemados, Cuba.

The importance of the discovery that yellow fever is transmitted by the bite of a certain species of mosquito did not fail to attract the prompt attention of the Military Governor of the Island of Cuba, himself a physician and formerly a distinguished member of the Medical Department of the United States Army. By his direction the theory was at once subjected to a practical test in the city of Havana, in which city yellow fever had not failed to make its yearly appearance during the past one hundred and forty years.

Under the efficient management of the Chief Sanitary Officer, Surgeon-Major Wm. C. Gorgas, U.S. Army, the sanitary regulations were so far modified as to require that every patient having yellow fever should not only be quarantined, but that his room should be promptly protected with wire-screens, so as to prevent the possibility of mosquitoes becoming infected by sucking the blood of the patient. As a second important measure, a systematic destruction of all mosquitoes in other rooms of the patient's house, as well as in adjoining houses, was at once begun, the fumes of pyrethrum being relied upon to stupefy the insects, after which they were carefully swept up and burned. In other words, Surgeon-Major Gorgas, relying upon the well-known slow progress of yellow fever, sought to destroy all mosquitoes, infected or non-infected, within a given radius of each case, while at the same time he effectually excluded all mosquitoes from access to the sick. If a secondary case occurred, the same hygienic measures were vigorously enforced along the lines above indicated.

As an illustration of what has been accomplished by these newer sanitary regulations, I may state that counting from the date when they were put into force, viz., February 15th, 1901, Havana was freed from yellow fever within ninety days; so that from May 7th to July 1st—a period of fifty-four days—no cases occurred. Notwithstanding the fact that on the latter date and during the months of July, August, and September, the disease was repeatedly reintroduced into Havana from an inland town, no difficulty was encountered in promptly stamping it out by the same measures of sanitation intelligently applied both in the city of Havana as well as in the town of Santiago de las Vegas, whence the disease was being brought into Havana.

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# Obituary.

WE regret to learn that Charles James Hill Wray, the Medical Officer of Health for the town and port of Brisbane, Queensland, Australia, has succumbed to plague. Dr. Wray was educated at Queen's College, Belfast, and held the diplomas of the College of Surgeons and Physicians of Edinburgh, where he qualified in 1870. Brisbane has at the present time a considerable outbreak of plague, entailing a great amount of work on an officer who, like Dr. Wray, held the post of medical officer for both the town and port; not only has accommodation, equipment and attendance, &c., to be provided for the actual sufferers, but the inspection of ships entering the harbour has to be rigorously attended to. Only those who have seen what a plague outbreak means in an important shipping port can gather the work thrown upon a medical officer in Dr. Wray's position. Before further medical assistance can be procured the tax upon the Health Officer at the initiation is enormous, and it is evident Dr. Wray has sacrificed his life in his desire to do all he could to limit the outbreak and stay an epidemic.

# Rebiew.

THE CAUSATION AND PREVENTION OF MALARIAL FEVERS. A Statement of the Results of Recent Researches. Drawn up for the use of Assistant Surgeons and Hospital Assistants. By Captain S. P. James, M.B. (Lond.), I.M.S. Illustrated.

Pp. 18. Simla, 1902.

Captain James, one of the members of the Royal Society's Commission on Malaria in India, has done a great public service by publishing this excellent pamphlet. It is most important that the class of men for whom the pamphlet is intended should combine intelligence with the more mechanical duties they are called upon to perform. It is impossible for these men, unless they are wisely instructed, to become so; but with Captain James's work in their hands, they cannot fail to gather the meaning and importance of the attempt to arrest malarial infection. The opening sentence is significant: "Malaria is the most important disease of India, and directly and indirectly accounts for more deaths than any other disease. A danger known and faced is already begun to be combated, and Captain James's plain statement declares the power and strength of the enemy. With this pamphlet non-medical men can recognise the different forms of mosquitoes, can gather their habits and become acquainted with their breeding places.

The methods of getting rid of and preventing malarial fevers are referred to under three heads:—

(1) The extermination of Anopheles mosquitoes.

(2) The administration of quinine.

(3) Isolation.

Excellent plates of the female Anopheles, of the heads of male and female Anopheles, of an Anopheles' egg, and of a full-grown larva drawn by Dr. S. R. Christophers, together with the wings of mosquitoes, form a useful addendum to a most welcome and important publication.

We hope the Indian Government authorities will see that this pamphlet is allowed to be sold in all the British Possessions where malaria prevails.

# Current Witerature.

THE SURGICAL PECULIARITIES OF THE AMERICAN NEGRO. By Rodolph Matas, M.D., Louisiana.

After a statistical inquiry based on the records of the Charity Hospital of New Orleans, U.S.A., decennium 1884—1894, Dr. Matas comes to the following conclusions:—

(1) The North American negro, as he is known at present in the United States, is anthropologically, physiologically, and pathologically different from his original African ancestors and from his uncivilised

brothers in the West Coast of Africa of the present generation.

(2) A residence of nearly three hundred years on the Southern States of North America in contact with the white man and under the influence of civilisation has produced a marked change in the mental and physical organisation of the negro.

(3) This change is evidently due to the combined influences of acclimitisation and adaptation to surroundings other than those of climate, and especially

to miscegenation with the white race.

(4) That the general morbidity and mortality of the coloured race was less than that of the white population in the South during the whole period of slavery and up to emanciption.

(5) That since the coloured race has been thrown upon its own resources (since 1864) its morbidity and mortality have enormously increased, and are now much greater than those of the white population.

(6) That in consequence of the altered conditions of existence the diseases which were peculiar to the slave period, and notably the more typical African diseases, are rapidly disappearing. On the other hand, the general liability of the negro to the common diseases of this country is rapidly increasing. So that many immunities which he formerly enjoyed have been lost and new predispositions to disease have been acquired. In other words, the tendency of the coloured race is to lose the specific pathological peculiarities which it acquired during the original process of race differentiation in Africa, and to rapidly subject itself to the conditions that affect the white race.

(7) There are no diseases which prevail exclusively in the coloured race any more than there are diseases which prevail exclusively in the white race. The differences, pathologically speaking, that do exist between the white and the coloured population lie only in the relative predisposition to some of the diseases that prevail in this country and in their relative

immunity from others.

(8) When viewed from the purely surgical operative standpoint, the white and the negro are practically alike, especially when individuals of both races, taken from the same social environment, are compared. There are no apparent differences between the races on the operating table. The same technique applies to both equally well; and often, especially in the matter of resistance to shock, the negro appears to better advantage than the white man. In the general and local reactions of the tissues to infection there are some differences between the races. It is in the histogenetic tendencies of the tissues that we fine the real surgical contrast between them. If we are to judge from this alone, the coloured race reveals in this last particular a marked tendency to degeneration.

(9) That the progress accomplished in modern surgery by the introduction of anæsthesia and antisepsis have proved just as applicable and advantageous

to the negro as to the white man.

(10) That the comparative statistics furnished by the records of the Charity Hospital of New Orleans for the last decennium on the surgical diseases of the coloured race confirm, in general, the conclusions of the United States Census of 1890, and are in harmony with the general impression that prevails throughout the South, viz., that the coloured race is degenerating, if by this we mean a growing inability to resist the

causes that are inimical to its existence.

(11) That the degenerative tendencies of the coloured race revealed by statistics, are due, essentially, to the influence of unfavourable hygienic surroundings; to unfavourable social (including moral) environment; to all the causes which lead to a bad heredity, vice, dependency, and degradation, and which are acting simultaneously upon an ethnologically inferior and passive race which is struggling for existence with a superior, aggressive, and dominant population.

# MALARIA.

Malaria and Mosquitoes.—The Japanese papers publish the results of experiments made by their military authorities to confirm the mode of infection of malaria. One battalion of soldiers in Formosa were efficiently protected for five months from the bites of mosquitoes during the entire malarial season, with the convincing result that the soldiers remained perfectly healthy. In another battalion who were not subjected to any protection or precautions and who were quartered in the same place and for the same time, 259 cases of malaria occurred. This experiment is not alone interesting from the point of view of the malaria-mosquito theory, in establishing in a striking manner that the mosquito is wholly and solely responsible for malaria, but it demonstrates how advanced the Japanese are in their study of medical science, and how ready to put the knowledge they have acquired to a practical test.

LATENT MALARIA.—George B. Young, M.D., in the Amer. Pract. and News, March 15th, 1902, divides latent malaria into three groups: (1) Cases of long incubation before the appearance of fever; (2) cases in which no pronounced clinical manifestations are manifested; (3) cases in which the determining cause of the onset of the fever is due to some cause irre-

spective of malarial infection.

There are several theories extant as to the cause of delay or suppression in the manifestations of malarial infection. (a) That the parasites lie dormant in the spleen, or bone, or marrow; (b) that they multiply so slowly that they fail to produce a febrile reaction; (c) that an entirely different cycle may be followed by malarial parasites under certain conditions. Under these circumstances it is incumbent to examine the blood for malarial parasites in almost all the less pronounced ailments met with in the malarial districts.

# TYPHOID FEVER.

THE TYPHOID BACILLUS.—In an address published on typhoid fever, by Victor C. Vaughan, M.D., in the Journal of the American Medical Association, April 19th, 1902, the following conclusions, after a systematic study of all toxicogenic germs found in samples of drinking water, suspected of causing typhoid fever, are announced:—

(1) A water containing a typical colon bacillus, one

which coagulates milk within from twenty-four to forty-eight hours, readily reddens litmus and produces an abundance of gas in glucose media, does not cause typhoid fever. There are several smaller cities in Michigan which send to us monthly their drinking water supply for bacteriological examination, and some of these waters contain the colon bacillus constantly; in fact, this germ never fails to appear when a test is made, and yet there have been no epidemics of typhoid fever among the people drinking these waters.

(2) The more markedly a germ found in drinking water differs from the typical colon bacillus, and the more closely it approaches the typical typhoid germ, the more likely is typhoid fever to appear among those using the water containing this germ. I am not ready, even after fourteen years of investigation of this matter, to lay down any rules by means of which I can say just where the line should be drawn between the colon and the typhoid groups, and I still continue to speak of typhoid-like bacilli, and I have no hesitancy in condemning waters which contain these

micro-organisms.

(3) I have never found in any sample of drinking water a typical Eberth bacillus. I do not say that such a germ may not be found in water, but I do not believe that the typhoid bacillus preserves its typical characteristics for any great length of time when growing in water. As confirmatory to this last statement, it may be worth while to mention the fact that Remy has found that when the typhoid bacillus is grown in company with the colon germ the former is so far changed that it cannot be identified by any means at our command at present, and that it even loses its susceptibility to the agglutinating action of typhoid serum.

Scables (ITCH).—Kaposi's ointment for scables :-

R	Beta-naphthol						3iii
	Cretæ prep.						Siiss
	Saponis mollis						3iii
	Adipis						3vi
M.	Ft. unguentum.	Sig.	: App	oly loca	illy at	night.	

TREATMENT OF BLACKWATER FEVER.—Dr. R. O'Sullivan-Beure states that in equatorial East Africa a decoction of "cussia abbreviata" is much extolled in the treatment of blackwater fever. This observer regards blackwater fever as a disease apart from malaria, although the two diseases may be combined in the same person.

CHOLERA.—The Philippines.—Up to April 20th, 1,244 cases of cholera were reported in the Philippines, of which number 902 died. Of this number 388 cases occurred in the city of Manila, with 300 deaths.

## PLAGUE.

PREVALENCE OF THE DISEASE.

India.—The deaths from plague recorded in India during the weeks ending April 5th, 12th and 19th, amounted to 23,286, 24,380, and 19,412 respectively. By telegram we learn that in Bombay city during the month of April of this year 2,833 persons died of

plague. In the districts of the Bombay Presidency, Kaira, with 1,061 deaths; Khandesh, with 1,179 deaths; Satara, with 981; Belgaum, with 720; Kathiawar with 1,823, and Cutch, with 572 deaths from plague during April, were the localities in which

the disease chiefly prevailed.

The Punjab is still by far the most seriously affected district of India. During the weeks ending April 5th, 12th and 19th, the number of deaths from plague in the Punjab amounted to 14,871, 16,281, and 14,145 respectively. In other parts of India the deaths from plague during the weeks ending April 5th, 12th and 19th, numbered respectively: Calcutta, 689, 603, and 588; Bengal, 788, 603, and 760; North-West Provinces and Oudh, 1,570, 1,660 and 773. In other parts of India the disease is less prevalent, and in many instances, especially in the South, the advance of the summer seems to coincide with a gradual lessening in virulence of plague.

EGYPT.—During the week ending April 20th, 27th, and May 4th, the fresh cases of plague in Egypt numbered 31, 18, and 22, and the deaths from plague during the same period, were returned as 19, 8, and 15 respectively.

CAPE OF GOOD HOPE.—Port Elizabeth is the only town or district of Cape Colony in which plague cases have occurred for two months past. The numbers are, however, quite insignificant. During the weeks ending April 5th and 12th, the number of fresh cases amounted to 2 and 5 respectively, and the deaths from the disease to 2 and 3.

Hong Kong.—During the weeks ending April 19th, 26th, May 3rd and 10th, the number of fresh cases of plague in Hong Kong numbered 7, 5, 28, and 24; the deaths from the disease during the same periods amounted to 6, 5, 26, and 19 respectively.

Australia.—A telegram dated Sydney, May 14th, states that there have been 126 cases of plague in Sydney, and 35 deaths from the disease since the present recurrence commenced. On May 14th forty cases of plague were in Hospital. By a telegram dated May 8th, we learn that 35 cases of plague were in Hospital in Brisbane, Queensland.

ARGENTINE.—A few cases of plague are reported in the Argentine, but the outbreak is quite limited.

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Caducée.

Climate. Clinical Journal.

Clinical Review. Giornale Medico del R. Esercito

Hong Kong Telegraph.

Il Policlinico.

Indian Engineering. Indian Medical Gazette.

Indian Medical Record.

Janus.

Journal of Balneology and Climatology.

Journal of Laryngology and Otology.

Journal of the American Medical Association.

La Grèce Médicale.

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Medical Brief.

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Pacific Medical Journal.

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Revista Medica de S. Paulo.

Sei-i-Kwai Medical Journal.

The Hospital.

The Northumberland and Durham Medical Journal.

Treatment.

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2.—As our contributors are for the most part resident abroad, roofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

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# Original Communications.

# THREE LECTURES ON BILHARZIA, Delivered at Kasr-el-Ainy Hospital, Cairo. By Frank Milton, M.R.C.S. Surgeon to the Hospital.

#### LECTURE I.

Gentlemen,—The disease which amongst us is generally spoken of as bilharzia and whose chief symptoms are manifested through changes in the bladder and large intestine, is due to the deposition in the tissues of the eggs of a trematoid worm, the Bilharzia hæmatobia, whose favourite habitat is the portal vein.

THE WORMS AND THEIR OVA.

Both male and female worms are found, the size and appearance of the two sexes being very different, the male being short and thick, measuring about 15 millimetres in length and rather more than 1 millimetre in breadth, the female is long and filiform, being about 20 millimetres long and not nearly so thick as the male. Although the portal vein is the part in which the worms are most commonly found and the place where they are looked for in the routine performance of post-mortem examination, yet it must never be forgotten that they are common also in the hæmorrhoidal and vesical veins, and have been found in widely separated parts of the body and may probably inhabit any part of the venous system. The whole of the various manifestations of the disease known under the name of bilharziosis are, as we have said, due primarily to the deposition of the eggs of these worms in the tissues of the part; these eggs are translucent oval bodies, about 0.16 millimetre in length and 0.06 millimetre in breadth; they are smooth surfaced and are readily recognised by their possessing a spine situated as a rule at one end, but which under certain conditions may be placed laterally, this latter occurring

frequently in eggs deposited in the rectum, whereas, the eggs recovered from the bladder invariably have their spine at the end. This variation in the situation of the spine has not yet been satisfactorily accounted for any more than has the function of the spine itself been decided; but whatever may be the cause of its various position, I think its function is probably to aid the egg in its task of escaping from the blood-vessels and penetrating the surrounding tissues until it makes its way to a surface from which it can be discharged from the body to continue its cycle of changes until it returns to its human host to be finally developed into the mature worm. What these changes are that occur after the egg is discharged from the human body is not yet clearly known, nor has it been discovered with certainty how the embryos of the worms gain readmission to the body.

## Mode of Infection.

Many quaint ways have been suggested as to how the embryos enter the body; some assert that the worms themselves enter by the anus or urethra of the victim during bathing, or even by the eggs making their way through unbroken skin through washing in infected water. All ideas of infection clearly point to water as being the medium through which the infected matter is conveyed, and it is almost certain that water is the vehicle, and that infection is brought about by drinking and by no other means. Segmentation of the yelk is said to begin in the uterus of the female bilharzia, and the eggs when discharged in the urine often contain a well-formed embryo, and even embryos have been found which have hatched out in the bladder, but when this has taken place the embryos have invariably died after a very short period, and have been of no importance from a pathological point of view, nor as helping to indicate their later life

By far the commonest seat of "bilharzia" is the urinary bladder, and it will be most convenient if we

consider the disease in connection with this viscus in some detail and then enumerate more briefly the changes which take place in the less commonly affected tissues. As a beginning of the disease we must, of course, have had the bilharzia worms introduced into the body of the host where they have established themselves and set to work to produce their eggs. The period of life and sexual activity of the bilharzia worm is not known, but it is probably of considerable duration, for cases have been recorded of patients who have ceased to inhabit countries where bilharzia is known to exist, continuing to pass living eggs after years of residence under circumstances where reinfection would appear to be an impossibility. Sonsino has recorded the case of an Egyptian student in France who, after nine years' uninterrupted residence in that country, was still passing living eggs in his urine. The eggs when laid by the female bilharzia are free in the blood-vessels and drift until they are arrested in some capillary whose calibre is too small to let them pass; this would seem to imply drifting against the current of the blood, as the eggs are produced in the veins where of course the current of blood is from small to larger. But I may perhaps be allowed to speak of drifting in the absence of any certain knowledge of how the eggs get from their point of origin in the larger veins to the smallest capillaries; that they do get there is certain, and that they do not make the entire circuit of systemic circulation is also certain, and we must be satisfied with these two facts.

#### Mode of Exit.

As the life of the embryo has to be passed outside the body of the host of the parent worm, Nature directs the eggs towards the nearest point of exit from the body, and this will be the nearest surface from which they may be discharged; thus it will be found that the eggs are directed towards the mucous membrane of the bladder, in the capillaries of which they become impacted.

#### CHANGES PRODUCED IN THE BLADDER.

Many eggs out of the enormous number produced go astray, and instead of finding their way into the mucous and submucous coats become lodged in the muscular, and even serous, coats of the viscus, where they give rise to a peculiar train of symptoms which will be referred to later on. At present we need only concern ourselves with the changes which take place in the internal coats of the bladder. At first, then, we have isolated eggs deposited here and there in the mucous and submucous coats; whilst these are comparatively few in number their presence would be difficult to detect, and they give rise to no symptoms; but as the parent worms go on industriously laying their eggs and discharging them into the bloodstream, more and more of these eggs find their way into the capillaries which are already obstructed by the earlier arrivals, and areas are formed in which the eggs are found closely packed together, and not only plugging the minute vessels, but many will have made their way through the coats of these latter and lie in the surrounding tissue. These deposits of eggs, when they have increased in size sufficiently to be

visible to the naked eye, will appear as small pellucid bodies situated in the mucous membrane and raising its surface above the surrounding level. As more eggs are deposited these patches increase in size, and neighbouring ones coalesce to form larger patches, until eventually the whole mucous membrane of the bladder may become involved. The most frequently and the earliest affected part is the base of the bladder, especially the trigone, and from here the affection spreads outwards. As the patches increase in size they also increase in thickness, owing to the overgrowth of the surrounding tissue due to the irritation of the presence of the eggs and also to the fact that Nature, striving to undo the mischief she has permitted for the sake of the propagation of the bilharzia species, tries to render the eggs harmless within the host by enveloping them in fibrous tissue and isolating them, as she does to foreign bodies embedded in living tissue elsewhere. These two processes, the irritative overgrowth of the normal tissue and the formation of new fibrous tissue, give rise to the formation of extensive raised patches of a yellowgrey or brownish tinge with a granulated surface and of hard consistence, whose feel, when explored by a sound, so soon becomes familiar to you in the outpatient room, and which is always pathognomonic of bilharzia. These patches, when they have attained a certain age, begin to lose their vitality, partly by the mechanical interference with their circulation and partly by the contraction of the new fibrous tissue of which they are largely composed, and as a result they begin to break down and even to slough, giving rise to ulcers and crevices on their surface which tend to retain a certain amount of urine in their cavities, and to set up decomposition in it and deposition of its salts. It would appear that in many cases the increase in the mucous membrane due to irritative hyperplasia is out of proportion to the development of fibrous tissue, and in these cases occur great overgrowth of the normal structure of the mucous membrane with formation of villosities, polypoid growths of great vascularity, and more solid cockscomb-like tumours, which are all equally typical of the disease. These growths, although they are very plentifully supplied with blood-vessels, are all liable to necrosis and ulceration from blocking of their capillaries by the bilharzia eggs with which they swarm, and their disintegration, as well as that of the thickened patches, gives rise to the typical bilharzia urine containing blood, pus, minute sloughs and bilharzia eggs entangled in mucus. It has been stated that mature worms have been found in dilatations of the veins in these polypoid growths, which would account for the enormous quantities of eggs and great overgrowth of tissue which occur in these cases.

# CARCINOMA AND BILHARZIA.

Besides the fibrous growth occurring in bad bilharzia cases, true carcinoma is also sometimes found grafted on to the existing disease probably beginning in an irritative overgrowth of the glandular elements of the mucous membrane; this co-existence of carcinoma and bilharzia is generally regarded as fairly common, but I think it does not in reality occur so frequently as some writers would lead one to expect, and what has been regarded as tumour due to cancer is, I think, in many cases, simply tumour due to excessive formation of what may be termed bilharzial tissue. This bilharzial growth, to which we shall so often have to refer, is in the later stages of the disease developed to a most extraordinary degree. It originates, of course, in the bilharzia patches described before, but the dense, thick masses of new tissue into which they develop lose all resemblance to the excrescences first formed. Unfortunately I have never yet been able to trace the development from the one form into the other continuously, but it would seem as if the new tissue after a time was formed too quickly to be properly organised, and the result is the formation of this dense, structureless mass which breaks down before the finger introduced into the bladder with resistance equal to recent blood-clot into approximately cubical rectilinear-sided masses having the appearance of pinkish cream cheese. Its amount is often very large, as it may form the sole contents of the distended bladder. Its vitality must be very low, and its destruction causes but little hæmorrhage. These excessive formations of new tissue in the mucous membrane of the bladder naturally interfere with its functions as a contractile viscus, and not only is it rendered incapable of properly expelling its contents, but there is also obstruction to the entrance of urine from the ureter; this in its turn causes dilatation of the ureters, which in process of time extend through their whole length and reacts on the pelvis of the kidneys, which become dilated and causes gradual disorganisation of the kidneys themselves. it happens, as is so frequently the case, that the contents of the bladder are represented by a collection of decomposing organic tissue and stinking urine, the step from simple dilatation of ureters and hydronephrosis to septic pyonephrosis is very easily

#### THE URETERS AND KIDNEYS.

The ureters and kidneys may themselves be directly affected by bilharzia, but this does not happen nearly so frequently as primary affection of the bladder, and it would appear as if the further the part was removed from the bladder the less likely was it to be attacked by the disease. Thus the ureters are fairly commonly affected in their lower third, the middle and upper thirds are rarely affected, the pelvis of the kidney more rarely, and the tissue of the kidney itself more rarely still; but cases have been described where eggs have been found deposited in its secreting structure.

At the other end of the genito-urinary tract the seminal vesicles are said to be frequently and severely affected, but for some reason or other we do not seem to have our attention drawn to this form of bilharzial affection at this hospital, nor do I ever remember to have met with it in private practice, and I think we need not give very much attention to its pathology.

Proceeding forward from the bladder we come to a part which is frequently and severely affected, and which is of the greatest interest to us as practical surgeons, for in it is found the form of disease which, though as a rule not directly threatening life, entails a vast amount of suffering in its victims, and which

is the form of the disease which is most amenable to surgical treatment—and that part is the urethra.

#### URETHRAL FISTULA.

The ultimate manifestation of bilharzia in the urethra takes the form of urethral urinary fistula, and it is on account of urinary fistula that so many cases of bilharzia come for treatment. It is interesting to note in this connection that of all the many cases of urinary fistula treated in my wards in Kasr-el-Ainy, and of all the cases coming for treatment in the out-patient department-and these must be counted by thousands rather than by hundreds, the invariable cause of fistula has been bilharzia. Even the few cases of perineal fistula after operation for stone, which have come from time to time, have had bilharzia as the primary cause of their malady, and I think I may safely say that I have never seen a case of urethral urinary fistula in a native of this country that did not owe its origin to bilharzia.

The number of cases of urinary fistula presenting themselves for treatment is very great, so much so that at one time it seemed as if the general usefulness of the surgical side of the hospital would be seriously impaired through the cases of fistula usurping all the available beds. It was therefore necessary to restrict the number of cases under treatment at one time to ten beds, or about 10 per cent. of the total male surgical accommodation. Those who have to dress the cases very well know these beds are invariably full, and only the resident assistant surgeon knows how many cases there are constantly waiting for admission in order to be relieved of this truly horrible disease, which renders its victims a nuisance and an offence not only to their neighbours but also to themselves, from the loathsome state of filth and stench which is unbearable even in this land of many odours.

The favourite situation for these urinary fistulæ is in the perineum, near the scrotum and on either side of the middle line, where the vast majority of fistulæ will be found. The next most favourite place is in the posterior part of the scrotum itself, but the fistulæ here are generally multiple, and more often than not accompanied by fistulæ in the perineum. Apart from these situations the fistulæ may occur in the anterior part of the scrotum, or in the penis immediately above the scrotum-but these are not common, and anteriorly to this point in the penis itself, although they do occur, they are excessively rare. Away from the course of the urethra itself they are found near the anus, in the ischio-rectal fossæ, above the pubes, and in the upper third of the adductor region of the thighs, but this only in very severe cases with many fistulæ. Although the external openings of the fistulæ may be distributed over a very wide area of the skin surface, practically the whole of them are limited in their origin to the part of the urethra immediately in front of the bulb. It will be found also that by far the greater number of these fistulæ take their origin from the pubic side or roof of the urethra; a small number will be found to take their origin from the perineal side or floor of the canal, but these are quite the exception, being probably in the proportion of less than one to twenty of the roof It would seem, at first sight, a needless splitting of straws to distinguish between fistulæ arising from the roof of the urethra and fistulæ arising from the floor, but the whole history, manner of formation, signs, symptoms, and sequelæ are different for the two forms, and more than warrant a practical dis-

tinction and description apart.

The floor fistulæ, although the majority are formed in the part of the urethra just in front of the bulb, are by no means so strictly confined in their range as are the roof fistulæ, and they may be found fairly frequently in the penile urethra. It would seem natural enough that the neighbourhood of the bulb should be chosen as the part of the urethra most frequently to be attacked by bilharzial disease, as in it is the largest collection of venous plexuses offering the most commodious resting-places for the parent worms, but it is not so clear why the roof of the urethra should be so persistently chosen for the point of attack rather than the floor. It is worthy of note here that although hundreds of cases come to hospital every year with presumably bilharzia worms in their corpora spongiosa, as indicated by urethral fistula, no one, as far as I know, has ever presented himself with evidence of the neighbouring venous plexuses of the corpora cavernosa being affected, and this is the more remarkable when we recollect the near connection between the penile and vesical plexuses of veins.

But to return to our subject. The method of formation of these urethral fistulæ is as follows: The first stage which is common to the two forms of the disease exactly resembles the process of formation of a patch of infiltration and infarction in the bladder; that is to say, the eggs are deposited in the submucous and mucous coats, and give rise to proliferation and overgrowth of these tissues, with later on death of small areas of the invaded part, due to blocking of the capillaries and to pressure from contraction of new fibrous tissue. Up to this point the process is common to all forms of bilharzia invasion, but after this point the disease follows a special course and varies according as the part affected is the roof or the floor of the urethra. In the roof of the urethra the infarction, as the mucous and submucous coats are destroyed, extends more deeply into the substance of the corpus spongiosum itself, and as the infarction proceeds so does the destruction of tissue in its wake, until a track has been destroyed down to the limiting membrane of the corpus spongiosum. This, in its turn, is attacked, and the disease breaks through into the space between it and the corpora cavernosa. Here the advance would appear to halt for a while, for in this position there is always found an accumulation of the peculiar white unhealthy granulation tissue which is formed in the track of these fistulæ. disease soon advances again, but at this point it takes a new direction, turning round the outside of the corpus spongiosum and making towards the skin surface in the perineum where, having arrived, the skin is destroyed in its turn, an opening formed, and the fistula is complete.

It is not very easy to see at first why the infarction and destruction of tissue in urethral bilharzia should extend deeply into the underlying parts instead of following the ordinary course of the disease elsewhere and extend along the surface, but the probability is that the fluid contents of the urethra, being in motion and under pressure, tend to break down the weakened tissue in the walls of the canal and to open up fresh spaces for depositing wandering eggs and detritus. The amount of inflammation involved in this process of formation of a roof fistula is very small, and the symptoms it gives rise to are not pronounced, but in the formation of a floor fistula the case is very different. Here, for some reason or another, the infarction and consequent destruction of tissue occurs in the perineal surface or floor of the urethra with the formation of an ulcer; the ulcer being in a dependent position would appear to act as a trap, catching and retaining dead, and it may be decomposing, matter, either from the bladder or from its own neighbourhood. matters, as they collect and as the ulcer extends in depth, set up a septic inflammation with formation of pus and infection and decomposition of any drops of urine which have infiltrated the part and been detained. In this way is speedily formed a periurethral abscess, continually receiving fresh supplies of decomposable material from the proximal urethra, and as continuously pouring out an extremely irritating mixture of septic pus and decomposed urine into the distal urethra. This state of septic inflammation with retention in the cavity of the abscess of decomposed and irritating matter, but without tension, owing to the continual escape of pus into the urethra, causes a great proliferation of the fibrous tissue elements in the immediate neighbourhood of the abscess until a fibrous tumour of stony hardness, and having in its centre a cavity containing stinking pus and débris, is formed in direct connection with the urethra. This form of fistula develops much more slowly than the roof variety, and in many cases the pus does not reach the skin surface until the process has been going on for a very long time, and obstruction to the escape of urine along the urethra on the distal side of the fistula has been brought about by secondary change induced in the canal by the septic discharges continuously passing along it.

# STRICTURE OF URETHRA.

Indeed, many of these cases come for treatment for the difficulty and pain in micturating and it is only on examination that the characteristic tumour is found. In this connection it must be especially noted that with roof fistulæ stricture is hardly ever found unless the disease is of very long standing and stricture has occurred from actual destruction of part of the urethra and surrounding tissue, caused probably by the breaking down of multiple foci of infarction which is by no means With floor fistulæ, however, stricture is invariably the rule, not only in the neighbourhood of the fistula but generally there is marked thickening and narrowing of the urethra in its whole length, from the opening of the fistula to the meatus. Not uncommonly, there is actual obliteration of the canal by cicatricial tissues due to the final healing of long-continued ulceration of the canal set up and maintained by the discharges from the fistula abscess. In cases of roof fistula there may be some difficulty in introducing a catheter into the bladder, but this is due to distortion of the urethra obstructing the passage, and

even in these cases if a full-sized catheter is used in the first instance the obstruction will hardly be noticed.

# BILHARZIA IN THE VAGINA.

Before leaving the genito-urinary system it is necessary to refer to the vagina, in which bilharzial affection sometimes occurs. Bilharzia, for some reason not yet understood, is very much rarer in women and girls than in men and boys; only a few cases of bilharzial cystitis in women occur in the practice of the hospital; urethral fistula is practically unknown; and I do not think I have ever seen an advanced case of bilharzia of the rectum in a female. I have, however, seen three or four cases of bilharzial affection of the vagina, so that taking the rarity of the disease as a whole among women, vaginal bilharzia would appear to be one of the commoner forms in the female. The mode of in-farction in the vaginal mucous membrane is the same as in the other organs already described, but the subsequent course of the disease would seem to vary. Unfortunately the examples of the disease that I have seen have never been fresh cases, that is to say, they have all been cases that have been for a more or less prolonged period under active treatment and afterwards sent on to me. In all these cases there has been great thickening of the mucous membrane, especially on the posterior surface of the vagina, where the membrane appeared as rugged and heaped up with deep transverse and shallower longitudinal fissures mapping it out into more or less regular areas of thickened tissue. There were no ulcers and no signs of ulcers having existed, but the whole surface was peculiarly dry and harsh, and as if it had been sodden for a long time and then thoroughly dried. This may have been due to some extent to treatment, but I think it was in part, at any rate, characteristic of the disease. In none of the cases that I have seen did the affection extend into the cervical canal, but after all the number of cases observed is but small and not sufficient to draw conclusions from.

#### INFECTION OF THE RECTUM.

Having referred to all the lesions of the genitourinary system which are of importance to us as surgeons, we may now turn to the digestive system, which is represented by the rectum where the disease is second only to the bladder in frequency of occurrence, and almost more distressing in its symptoms; and where, although it is less directly threatening to life, the treatment, at present at least, is equally hopeless. As might be expected, the lower end of the intestinal tract, surrounded by a large plexus of veins, and affording all the conditions which would appear most desirable to the adult bilharzial worm, is very commonly the seat of his activities.

The mode of infection and the early stages of the disease affecting the rectum need not be particularly referred to, as they are essentially the same as have been already described in connection with the affection of the bladder, namely, deposition of the eggs in the mucous membrane and submucosa, with infarction of the smaller capillaries and development of new fibrous tissue, overgrowth of the tissues of the part, and localised death of minute portions of tissue.

Although all these changes take place in the rectum, the changes which are most marked and most fully developed are those which make for an increase of growth rather than the changes that bring about necrosis; and thus the disease develops on rather different lines to those followed in the bladder where necrosis is more marked, and the overgrowth of glandular structure is less. Thus in the well established disease the hard indurated patches common in the bladder are never found in the rectum; but instead the mucous membrane becomes hypertrophied and excessively vascular, the surface layers are deeply injected and readily bleed when handled, and the appearance of the surface resembles rich red velvet. After a time the elements of the mucous membrane, probably owing in part to their excessive nutrition, take on abnormal growth with thickening of the structure and general increase in bulk, and with excessive local overgrowths which take the form of polypoid adenomatous tumours. Near the anus these polypoid tumours bear some resemblance to ordinary hæmorrhoids, but within the gut, and especially beyond the internal sphincter, they differ materially from these latter. In the first place in a given area they are infinitely more numerous than piles ever are, and instead of being rounded and smooth like hæmorrhoids their surface is velvety from thickening of the mucous membrane itself, and their outline is broken up in all directions by the formation of secondary polypi growing from their own surface and branching in all directions, until the larger and fully-developed tumours bear a great resemblance to red branching coral. These tumours extend high up the rectum beyond the reach of the finger and this is so invariably the case that it would almost suggest the idea that the affection of the rectum begins from above, in the neighbourhood of the sigmoid flexure, and proceeds downwards; a possibility which has a most important bearing on treatment, as will be seen later on. The infection of other parts of the digestive system, such as the liver, and the consequent production of sclerosis of that organ does not concern us as surgeons, although there have been suggestions of the possibility of a connection between bilharzial infarction of the liver and hepatic abscess; but up till now the connection has never presented itself forcibly to me and I think that for the present we may allow the question to stand over. Bilbarzial infarctions giving rise to abscesses and sinuses occur in what might be called irregular positions. Thus in a very interesting case of multiple superficial sinuses in the sacral region, of a boy, aged 12, for which no cause was very apparent, I was so struck by the peculiar appearance of the granulation tissue removed when they were scraped out, that I sent a specimen to Dr. Symmers, who reported on it as being full of bilharzia eggs, and this although the boy had no signs of bilharzia either in his rectum or

Dr. Symmers also once showed me a tumour the size of half a walnut, which he had removed post mortem from the free edge of the broad ligament of a young girl, and which was made up entirely of bilharzia eggs and young fibrous tissue. These cases are to be especially noted as re-enforcing the fact which is always in danger of being forgotten, that bilharzial

infection is not confined to the urinary and digestive systems, but may occur in any tissue or part of the

body.

Gentlemen, having to-day concluded my remarks on the pathology of this most interesting disease, on the next occasion we will discuss its symptomatology and diagnosis.

# THREE CASES OF TUMOUR OF THE NOSE.

By Frank Cole Madden, M.B., B.S.(Melb.), F.R.C.S.

Professor of Surgery Egyptian Government School of Medicine, and Junior Surgeon Kasr-el-Ainy Hospital, Cairo.

In the issue of the JOURNAL OF TROPICAL MEDICINE for May 1st, 1902, I find a series of photographs of a peculiar disease of the nose, which resembles some cases of a somewhat similar nature which I had at Kasr-el-Ainy Hospital last year, and I venture to forward you photographs of them for publication.

Photograph I. represents an Egyptian woman, aged 35, who came for treatment originally for a small, hard, mucous-like polypus, which was projecting from the anterior nares. The nose gradually expanded, became flattened, and presented a peculiar saddleshaped appearance, the skin at the same time becoming hard and thick, very like pig-skin, with much hypertrophied sebaceous glands, and a wide separation between the individual hair follicles. The opening of the nostrils soon became completely blocked, and a thick, hard collar of fleshy substance protruded. The upper lip was never at any time affected, but there was a small hole in the hard palate, but without any ulceration. The condition gradually developed and took nearly two years to reach the condition illustrated in the photograph. The patient would neither enter hospital or submit to any operation, and I have now lost sight of her. The interesting point, however, is that the other two cases seemed to start in very much the same way, but progressed much more rapidly.

Photograph II. is that of a Soudanese man, who was admitted to hospital on April 11th, 1901, in the condition depicted. He stated that it began as a small nodule inside the right nostril, which gradually increased in size. He had suffered much at the hands of many native "barbers," with cauteries, scrapings, scissors, &c., before he was admitted, and all to no purpose. As will be seen, the disease had broken down and had affected the whole of the anterior part of the nose, as an ulcerated, protruberant mass, with thickened, infiltrated skin at the margins. The front part of the septum is also involved, and there is an ulcerated surface covered with granulations of an unhealthy character in the mouth between the upper lip and the gums over the central incisors. The unaffected portion of the nose is hard, and the skin is in exactly the same condition as Case I., with the same widening, flattening, and pig-skin appearance. A small piece of the growth from the gums was examined and found to be a round-celled sarcoma.

The whole of the mass was removed, the free margin of the lip being left. The result of the opera-

tion was very good, though a future operation for a new nose will be necessary. There was no sign of recurrence several months after the operation.

Photographs III. and IV. represent a far more severe case of the same condition. She was an Egyptian woman, aged 32, who dated her illness from a fall on the nose; but, on closer examination, she stated that the small fibrous tumour, seen to the right and upper side of the mass, came first, and I have no doubt the disease started in much the same way as the others. The general appearances are just the same, but there was an ulcerating mass, involving the greater part of the hard palate and filling up the space between the alveolar processes of the upper jaw. The red margin of the lip was not affected, as is seen in photograph IV.

After performing preliminary tracheotomy, I was able to remove the whole mass in its entirety, though it ran back as far as the naso-pharynx and involved the whole of the hard palate. I subsequently tried to make a new nose, but with only partial success.

make a new nose, but with only partial success.

These three cases resembled rhinoscleroma, but there was no affection of the upper lip, and no special tendency to spread in the substance of the skin or mucous membrane. Actinomycosis was also suggested, but examination of the pus gave a negative result. Syphilis, lupus, and tubercle were also possibilities, but the cases were pronounced to be sarcomatous by the examination of a piece of the tumour. The last two cases also illustrate the difficulties under which "tropical" surgeons work, for it is hardly possible to realise that any English patient would allow his disease to assume such proportions before seeking medical advice.

# SLEEPING SICKNESS; A FORM OF CEREBRAL ELEPHANTIASIS.

A SUGGESTION BY OSBORNE BROWN, M.B.

Assist. Col. Surgeon, Elmina Castle, Gold Coast.

I would like to make a suggestion regarding the etiology of sleeping sickness. It is only a suggestion, and I make it in order that those who may come across cases of this disease may follow it up.

In some cases the embryonic form of Filaria perstans was found in the blood. May the disease not be caused by the parental form of this or other embryos circulating in the blood occluding the lymphatics leading from the brain, causing chronic inflammatory changes there similar to elephantiasis in any other part of the body? In other words, may not sleeping sickness be a sort of cerebral elephantiasis? We know that there is perivascular inflammation and degeneration of nervous elements, with appearance of cholin in the circulation.

Dr. D. C. Rees has been appointed Medical Inspector on the Staff of the Medical Officer of Health for Cape Colony. It will be remembered that Dr. Rees formerly held the appointment of Medical Superintendent of the London School of Tropical Medicine.

THE SLEEPING DISEASE (Doenga da Somno).

From the Portuguese.

REPORT SENT TO THE PORTUGUESE MINISTER OF MARINE BY THE SCIENTIFIC COMMITTEE SENT TO STUDY THE SLEEPING SICKNESS IN WEST AFRICA, ON FEBRUARY 21st, 1901.

(Continued from page 151.)
PART II. (condensed).

We have up to the present observed clinically 28 individuals attacked by the sleeping disease, 22 males and 6 females, including the 5 cases we studied during our residence in the Island of the Principe. Of the 28 cases, 13 were adults, and 15 between 7 and 11

years.

The patients under observation in Loanda were 11 natives of Donda, 3 of Libollo, 3 of Quissama districts near to the River Quanza, 1 from Caboverde, 1 from Malange, residing in Dordo, 1 from Gelungo Alto, 1 from Beneguella, 1 from Sierra Leone, residing in Loanda, 1 from this city; the others lived in Josudo, near the river mouth. Of all the patients 12 died, and all were examined post mortem.

# DURATION OF THE DISEASE.

Judging from the few cases we were able to gain reliable information concerning, the duration of the disease seems to be about three to four months.

#### SIGNS AND SYMPTOMS.

Sleeping sickness shows itself principally in notable perturbations of the lymphatic, the nervous, the circu-

latory, and the calorific systems.

There are always glandular swellings, sometimes limited to the region of the neck, but sometimes occurring as a general swelling, invading more or less the lymphatic glands of the rest of the body. The glands when enlarged are isolated, seldom as large as a walnut, and cause no local irritation. Between gland and gland, the engorged lymphatic vessels rarely prevent any sign of hardness. It would appear that these glandular swellings precede the appearance of other symptoms.

The patient falls into a profound state of weakness, not even responding to any exterior excitement. The sense of touch is maintained in normal condition. The sense of pain is very acute; patients are able always to distinguish the sense of heat and cold.

The muscular sense or conscious movement is conserved almost wholly up to the last. The patients with their eyes bandaged have perfect knowledge of the different parts of the body experimented on. There are no subjective perturbations of sensibility, except the general cutaneous itching of the trunk and members which we believe to be independent of any eruptions. In the course of the disease no alteration of any note in hearing, smell, or taste was observed.

The reflex sensibility, both superficial or deep, during the sleeping period presents a variety of different combinations; when nervous depression was deferred the reflex action was increased. In the ultimate phases of the disease, however, the reflex sensibility is suppressed. In no case was the Argyll-Robertson pupil noticed. The reflex sensibility of the conjunctiva usually continued till the death stupor.

In some cases, notwithstanding the advanced stage of the disease, there did not exist any notable reflex disturbances, either superficial or deep. Muscular tremblings were noticed in all the patients. These movements begin by isolated contractions of the fibres of the muscles here and there without provoking movement of the members, then they become more accentuated, causing contractions of an entire muscle. At last the tremblings cause rythmic oscillations of the limbs, the trunk and the features.

In the first phases of the disease all the movements are precise and co-ordinate. By degrees the movements become impeded and the walk slower. At last the "myasthenia" reaches such a degree as to pre-

clude the possibility of standing.

Romberg's sign is always absent. Paralysis does not exist, and when the patients cannot leave their beds on account of the muscular "asthenia," they nevertheless can change position in bed and scratch them-

selves.

Convulsions or intense contractions we never saw; but we noted a rigidity, a feeling of hardness in the muscles. This state of the muscles make the patients, however, gradually take up certain fixed positions; one of these was the bending of the legs over the thighs in a convex manner, and also the forearms over the arms and the hands over the forearms.

In two cases only did we come across Kernig's

sign.

Sleep dominates the morbid symptomatology of the brain. It is one of the initial manifestations, which in the first place arrests the attention of the patient. At the beginning the tendency is easily overcome, but afterwards the patients go to sleep in the midst of their occupations. It is not rare to see them going to sleep in the middle of dinner, leaving the food unmasticated in the mouth.

The attacks of sleep are never progressive and regular. There are some days when this symptom is very marked, and others in which it is almost absent, but finally the patient settles down to a permanent

and almost constant sleep.

It is never so profound that they cannot be wakened with relative facility, but then they fall to sleep again when they are left alone, and the sense of

hunger wakens them.

In some acute cases, when the patients are prevented from doing anything, they attempt to bite the persons attending on them, crying out, and after falling into a paroxysm of tears become calm again. Others become melancholic and sad from the beginning of the disease, constantly weeping and in a marked state of physical depression. One woman had fits of gaiety and laughter followed by profound torpor and cerebral "asthenia."

The memory does not seem to be affected. The volition is evidently influenced by the sleep and as the disease increases so the will power becomes less.

The concentration of the attention becomes more difficult as the disease progresses. We have never noticed alterations of speech or in the manner of writing. We have never observed cases of "paraphasia," "jargonaphasia," or any other important alteration of this sort.

In the circulatory apparatus, the most notable

symptom, which is almost constant, is the diminution of the arterial tension. We have noted this symptom in patients in whom the disease was only beginning.

The pulse, frequently normal at the beginning, becomes in the more advanced states irregular and generally ends by being arythmic and thready. No cardiac bruit has been noted, but a modification in tone of the heart sounds is the rule.

The blood changes observed noted by Manson in two cases of "filaria perstans," we have never met

The percentage of hæmoglobin, measured by a hæmometer, of Herschel, is always of less degree, varying between  $\frac{8}{19}$  per cent. and 10 per cent. We have not observed anything abnormal in the white and red corpuscles; from the contents of the corpuscles we cannot draw any definite conclusions.

The temperature chart of the patient never has a cyclic evolution. Now and again there are febrile accessions, generally in the evening; malarial parasites were only found in one case. The temperature rises usually just before death.

The lungs remain normal as a rule; in one or two instances some hypostatic congestion was observed. The rythym of the breathing is maintained until towards the end, when slightly marked Cheyne and Stokes respiration has been observed. No "pituitary" signs or symptoms were present in the nose, nor any marked affections of the pharynx, gums, or teeth. The tongue always showed itself as clammy and wet; profuse salivation we never saw; the tonsils appear normal. The patients preserve their appetite to the end.

In no cases was vomiting present, nor do we attach any specific importance to occasional attacks of diarrhœa. The liver and spleen are usually passively enlarged; jaundice does not occur in sleeping sickness.

The analysis of the urine made systematically shows constantly the presence of albumen in small quantities, in some cases only traces; no sediment is, as a rule, to be met with. The "urobilin" existed always in greater quantity than the normal in the urine allowed to stand. I have seen in some cases, without notable "polyuria" coinciding with a density relatively small, a notable diminution of urea and the phosphates.

In adults the power of erection of the penis is lost. It is an important fact that the post-morten examinations reveal the constant presence of an infra-arachnoid secretion, noticeable in the ventricles and the "sub-serous" spaces. In some rapid cases the effusion of this liquid assumed immense proportions. The liquid is never transparent, always with more or less turbidity, sometimes bloody, but we have never seen it take the macroscopic character of pus. The presence of this secretion is evidently due to the existence of an inflammation-pia-arachnoid meningitisof acute and variable intensity.

These lesions predominate on the convexity of the hemispheres; the cerebellum is also a favourite seat of this effusion. By these lesions the dura mater becomes adherent to the subjacent meninges, but adhesion of the pia mater to the cerebral substance does not exist.

When the disease becomes more acute the effusion becomes more abundant, with marked congestion of the arteries and the veins of the dura mater without the formation of adhesions; effusions occur into the ventricles; a few adhesions and very occasionally some softening of the thalamus opticus and adjacent part of the brain tissue are met with.

In the cerebellum occasionally there is a predominance of inflammation in the upper "vermis." Similar changes to those observed in the cerebrum have been observed in the cerebellum.

In the heart, the only morbid changes which appear constantly are the yellow colour of the surface of the heart, and concentric hypertrophy of the left ventricle. There never are any signs of endocarditis. Lesions of the pericardium I have seen a few times only. Apart from old pleuritic adhesions, there was nothing found of an abnormal character in the respiratory apparatus; in the lung tissue pneumonic congestion was found once or twice.

The glands at the bifurcation of the trachea were

frequently enlarged.

The spleen varies in volume, being diminished or increased; it usually becomes of a leaden colour and its consistence is but little changed.

The liver does not usually present any macroscopic

differences from the normal state.

The kidneys have sometimes signs of congestion and also slight inflammation.

In the other visceræ nothing was found worthy of note. The lymphatic abdominal glands were generally swollen.

(To be continued.)

THE DURATION OF THE LATENCY OF MALARIA AFTER PRIMARY INFECTION, AS PROVED BY TERTIAN OR QUARTAN PERIODICITY, OR DEMONSTRATION OF THE PARASITE IN THE BLOOD.

By Dr. Attilio Caccini.

Assistant Physician, Hospital of Santo Spirito in Sassia, Rome; Lancisi Clinique, under the direction of Prof. Giulio Bastianelli.

(Translated from the Italian by St. Clair Thomson, M.D.Lond., F.R.C.S.)

PART II.

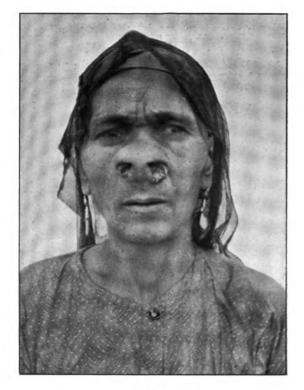
ON RELAPSES AT SHORT INTERVALS.

(Continued from page 155.)

(2) QUARTAN WITHOUT QUININE TREATMENT.

As a rule, in every quartan case in which we did not exhibit quinine, we would repeat what we stated in reference to spring tertians. That is, after a greater or lesser number of attacks more or less typical, the febrile attacks did not return. This result obtains whether the patient continues to work, or whether he is under observation at the hospital leading a life of strict repose in bed, with a rigorous hygienic diet, and with abundant and healthy nourishment; in the latter instance, as a matter of fact, the fever ceases in a shorter time and in a greater number of patients. In similar conditions this spontaneous

# JOURNAL OF TROPICAL MEDICINE, JUNE 2, 1902.



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Fig. 3.

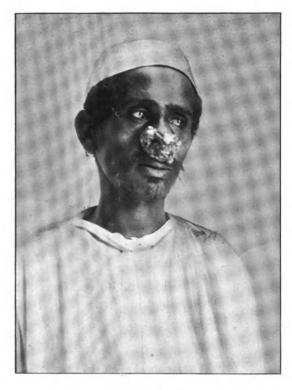


Fig. 2.



Fig. 4. Same as fig. 3, showing the non-implication of the edge of the upper lip.

PHOTOGRAPHS ILLUSTRATING CASES OF SARCOMA OF THE NOSE.

By Frank Cole Madden, M.B., B.S., F.R.C.S., Professor of Surgery, Egyptian Government School of Medicine, Cairo.

Bale & Danielsson, Ltd., London.



disappearance of the primary infection is more prompt even in the spring quartans than in the tertian We may note also that while relapse occurs without our detecting the determining cause in the spring tertians, in the quartans not submitted to quinine, and in similar conditions, the attacks do not continue to manifest themselves except as a consequence of determining causes, which we can establish exactly in the greater number of patients. Hence, there is definite and diverse behaviour between the spring tertians and quartans; in fact, all the quartans observed for a certain time in the hospital never had a relapse at short interval if they were not exposed to some of the accidental determining factors of which we spoke at the beginning; while in the spring tertians the relapse, as we have seen, occurred within a period of time varying between five and eighteen days, and independent of accidental factors. These factors in the spring tertians have no other effect than to abbreviate the duration of the latent period; and it is for this reason that patients · left to themselves relapse after a shorter apyrexial period than in the patients well treated, in whom it is easy for the apyrexial period to reach the maximum limit of eighteen days. These facts, met with in patients in the hospital, were also confirmed every time an observation was made on an individual who lived in almost identical conditions to those of patients in the wards. On the disappearance of the febrile attacks in the quartan cases there was constantly a corresponding improvement of the general condition and of the anæmic. This improvement was certainly rapid, so much so that the patient, deceived by his sense of well-being, often wished to take his discharge. I was never able to note any case of complete spontaneous cure of quartan infection; the relapse came either in a short interval or after a month or so, that is to say, as soon as the patient was no longer in hygienic conditions with regular diet and rest.

This I was able to show in 118 cases of quartan infection which I was able to follow for a long time without submitting them to the quinine treatment. Indeed, in these 118 cases only 8 relapsed after a short interval, and only in consequence of one of the usual factors (see Table).

# (3) Observations.

One can, however, assert that individuals of any condition, age, profession, or station, when compelled to lead a regular life of rest, removed from fatigue and exposure, supervised in their diet, not exposed to damp, wet, cold, &c., can remain for a long time in conditions of good health without any relapse at short interval; while, on the other hand, if any of these patients did not follow this method of life even for a short period of time, they always inexorably met with a relapse, sometimes even after a few hours. However, while in the spring tertians, as we have seen, the neglect of the quinine treatment infallibly leads to relapse at short interval (only one escaped this out of 121), in the quartans, on the other hand, either with or without quinine they managed to escape this relapse, providing that they avoided the accidental factors of relapse.

Another statement that can be made is that while in the case of the spring tertian the patient, though improving, never returns to complete health (indeed he has both general and local disturbances during the apyrexial period); in the quartan, on the other hand, this cure is absolutely complete, and the patient does not complain of any special disturbance during the apyrexial period. One can even show, by objective examination, that the alterations of the general condition diminish until they cease entirely and we have complete reduction of the splenic tumour, which, on the other hand, in spring tertian, constantly lasts into the apyrexial period with very little alteration. This, let us repeat, is in the case of patients who are well looked after.

We may, however, from that conclude that there probably is no true and proper relapse at short interval unless the patient exposes himself to some of the accidental factors of relapse.

It may be worth recalling once again the relapse which took place in 8 of the 118 cases of quartan not submitted to quinine, as soon as they were exposed to the action of one of the mentioned factors.

Now it results from daily observation, that quartan infection has a character of great obstinacy, and that a sequela of relapses at short interval almost constantly occurs with it. Well, now, that in no way contradicts my observations, inasmuch as it is easy to understand that it is very difficult for these quartans to lead a life so hygienic as to avoid all the accidental factors of relapse. On the other hand, this leads to another affirmation, and that is, that the quartan infection has a special obstinacy, owing to which, whether treated or not, it remains latent for an indefinite time, always ready, however, to produce a febrile attack as soon as the individual offers the very smallest diminution of his organic resistance.

Hence, to induce a relapse a return to habitual work, even though not fatiguing, may be enough. On the other hand, admittance to the hospital is in itself sufficient to cut short a relapse. And since the examination of the blood of quartans is almost always negative immediately after the outbreak of relapse, these quartans are often taken for malingerers, since, when the medical visit takes place, they have already had sufficient rest to disperse all the superficial symptoms of the disease, and the microscopical examination of the blood has been omitted.

Is it then possible to establish the duration of

the latency of quartan?

On the whole we may say that the relapse at short interval, while it occurs in the spring tertian within certain limits, and often in spite of any precaution, in the quartan, on the other hand, the relapse at short interval is always avoided when the patient is kept in regular conditions of hygiene and diet. But as soon as these cease the relapse occurs quickly and in spite of treatment after no matter what lapse of time, since we were able to prove a relapse even after only four days of apyrexia in a patient who, as soon as he left the hospital, was exposed to rain for some time (five hours).

It seems here opportune to recall what took place in all the cases of inoculation of quartan which I attempted for purposes of study. I was able to protract at my pleasure the period of incubation, by keeping the patients whom I had inoculated in good hygienic conditions (that is, insisting on rest in bed, good food, &c.), without giving them any medicine whatever. On the other hand, I was able to abbreviate this period by exposing the patients to cold baths and the application of electricity, mustard leaves, &c., in the region of the spleen. So I was able in some cases to make an incubation period of more than ninety days, and in others of seven to eight days. It is worth noting that the febrile attacks only appeared when I wished them, and that was when I exposed the patient to one of the said debilitating causes. A similar condition held good in the relapses.

# (4) SUMMARY.

Summarising the facts stated we come to the following conclusions:—

That quartan is the most obstinate in relapsing in reference to relapse at short interval, and in frequency. Many authors have already observed this. It would appear, however, that quartan only relapses in consequence of determining causes, which are nearly always traceable in each case. That is, quartan has not a true and proper period of latency for the relapse at short interval, but the duration of this period, instead of being constant and uniform, is determined by the intervention or non-intervention of a given occasional cause, after which the febrile outbreak follows shortly (eighteen to forty-eight hours). There is no preference between one or other of the causes of organic weakening, but probably the most important factors (and perhaps also the most frequent) are rain, cold, traumatism, &c.

The relapsing febrile attacks, typical or not, can appear even after a period of two months of latency, on the intervention of any accidental factor. It only remains to see whether in quartan also the outbreak of infection is always subordinate to the intervention and effect of a determining cause, as always happens with the outbreak of a relapse, at least as I have generally remarked. It is necessary to see if, during the long period of incubation, which it is determined may last two months,1 there exist endoglobular forms circulating in the blood, and following a cycle of constant development of seventy-two hours, without any manifestation. On the other hand, I have never, up to the present, had any opportunity of observing this. Besides, we may say that either in the internal organs, or perhaps even in the circulating blood, there is in some shape, or even in shapes not up to the present studied, the germs of the disease for which it only requires an occasional cause to give rise to their development in the known forms of feverproducing cyclical endoglobular parasites.

The intervention of the determining cause is not difficult when one has to do with individuals who live and work in the Campagna, badly clothed, lodged, and fed, subject to irregularities, and to physical and mental traumatism, so that it is easy after twenty-five to thirty days' residence in malarial quarters for the

"Proceedings of the Society for the Study of Malaria," 1901, vol. ii., p. 108.

quartan to break out amongst workers. Also, it is not rare to meet with cases in persons in our hospitals who although removed for some time (two to three months) from malarial districts without ever having had any symptoms, yet in consequence of a traumatism, an administration of chloroform, some intercurrent illness, cold, or change of air, are seized with quartan febrile attacks, with positive results from the examination of the blood. In these cases one is forced to admit that the infection has existed for a long time without ever having had the opportunity of breaking out. In fact, whether for the incubation of the primary infection or for the latency for the relapses, there is probably no fixed period, both the incubation and the latency ceasing only on the presence of some accidental factor.

Just as in quartan there does not exist a true and exact fixed and determined period of incubation (and this results from the observations carried out on patients inoculated by me with quartan, as I have shown above, and from what authors have here and there recorded), so for quartan itself there appears to exist neither a fixed and determined period of latency after the exhaustion of the fever or its disappearance under quinine. This fact can be demonstrated almost constantly when with careful observation and with minute interrogations of the patient, one succeeds in exactly weighing every minute detail of the history. Quartan fever, while in appearance distinguished from spring tertian, and as we shall see from malignant tertian, because it has not like these an exact period for the duration of incubation and latency, still by examining carefully one sees that it behaves in a similar manner to malignant tertian and to spring tertian. In fact in spring tertian and in malignant tertian the period of latency behaves in duration like that of incubation; and since this latter constantly oscillates within certain fixed limits, so also the latency oscillates in the same limits of time; while the quartan, which has no fixed duration of time for its incubation, has neither any for its latency.

# CHAPTER 3 .- MALIGNANT TERTIAN.

We know that in malignant tertian the apyrexia which follows, whether owing to the spontaneous exhaustion of the fever (exhaustion, however, which is known to be not at all rare), whether to the quinine treatment, is not as a rule enduring. My ressarches have shown that the apyrexia lasts as a rule from five to twenty-one days, and that the outbreak of the relapse is in no way impeded or retarded by the quinine treatment, whether in itself or combined with arsenic and iron. These facts besides, are found noted here and there by various authors.

# (1) Cases of Malignant Tertian Treated with Quinine.

It is well to recall that it is not suitable to carry out a comparison between various individuals and the various systems of quinine administration already stated in regard to spring tertian and quartan. Because, given the danger to which they are exposed in summer fevers, when left without quinine, one is as a rule compelled to administer the remedy during any

period of the fever, or of the apyrexia, as soon as ever the examination of the blood, or serious symptoms, show that we are in the presence of a summer malarial infection.

However, from the patients that we were able to observe for some time, in twenty of the most robust and in whom one was able with confidence to await the opportune moment, the treatment was attempted of administering the quinine shortly before the febrile outbreak; in twenty-three other patients at the acme of the fever, and in nineteen others during the sweating stage. Now as to the result: Except for the modifications in the temperature curve induced by the treatment (modifications already excellently stated by Marchiafava and by Bignami in their classic work on "Spring and Autumn Fevers"), nothing was met with differing in the duration of the latency of the infection; i.e., the fever appeared always in all the three categories of cases between the fifth and twentyfirst days, maintaining almost the same proportional numbers of relapses as in the patients who were not

submitted to quinine.

It is to be noted that all the patients with malignant tertian were energetically treated with quinine, being given a gramme and a half or two grammes of quinine, per day, even after the cessation of febrile outbreaks. This administration was carried out according to occasion either by the mouth, the rectum, hypodermic or intramuscular injections, intravenous, or by a mixed method. Some days the dose was often larger than usual, reaching three or four grammes in twentyfour hours. However, the relapse occurred all the same, and in spite of the energetic treatment it occurred invariably between the fifth and twenty-first day of apyrexia. We were able to observe that as a rule, an equal period of time did not elapse between one relapse and another, in the same individual. Only in one case had the fever through these relapses regularly returned in the early hours of the eighteenth day of apyrexia, seizing the patient constantly while in a condition of the best bien-être. In this case the attacks were of a pernicious and delirious form, and in spite of the quinine, lasted one or two days. In almost all the other cases of spring tertian in which quinine was administered a few hours after admission to hospital, without it being possible to establish exactly in what moment the patient was fully "quinined" (there were 3,607 cases), it was possible in a majority of instances (i.e., in 2,003), to follow at least one relapse, and we were able to show that there was no notable difference in the percentage of relapses, between the patients who remained permanently in hospital during the apyrexia, and those who, deceived by the relative comfort of the apyrexia, asked for their discharge as soon as the fever ceased. I was able to show this by the study of a small group of workers (160 men and women) whom I followed for some time. All these workers fell ill late in July from various malarial infections, 90 of them from summer infections. All the 90 relapsed between the fifth and twenty-first day of apyrexia. It is worth noting that the whole group were regularly submitted to energetic treatment by quinine.

Of 792 patients whom I followed in the hospital for more than thirty days, all relapsed except 24 (we

must, however, note that these 24 patients did not lend themselves well to observation, either in consequence of their riotous character or from special conditions of health).

I was only able to show that the relapse occurred as a rule sooner in those patients who left the hospital as soon as the temperature fell, or in those workers under observation in the farms, than in the patients

treated in hospital.

In the former case, indeed, apyrexia lasted from five to nine days, and only a few relapsed between the ninth and eighteenth day of apyrexia; a good number only relapsed between the seventeenth and twentyfirst day, and relatively few relapsed between the ninth and tenth days.

This, of course, was in patients who continued the quinine treatment at the dose of one to two grammes

per day.

I did not find any sensible difference in the duration of latency in reference to sex or to age. The greater number of relapses in adults is only due to the smaller proportion of women and children who engaged in work. Still I would say in parenthesis, in children, one or more relapse of summer malaria may pass unobserved, and, as a rule, is often followed by a serious outbreak of unexpected pernicious fever. the other hand, a remarkable influence on the outbreak of relapse is produced by scarce or bad nourishment, rain, moisture, cold, traumatism, excessive fatigue, gastro-intestinal disorders, &c., which shorten in a remarkable way the period of latency in the relapses at long interval. Indeed, in the fields, when a certain number of workers have been exposed to these causes, even after a few hours, but as a rule after one or two days, there is an outbreak of relapses. Besides it is known and proved in reference to the period of incubation which is considerably abbreviated in those who, being still infected, are exposed to the effect of one of those causes of general debility.

That exposure to these causes suffices to shorten the period of latency is proved by the simple fact that a wet, cold, hot, or damp day is not followed by any shortening of the period of latency in patients under treatment in the hospital; with these it is found that the attacks recur at the regular interval and not sooner than usual. The case of the hospital patients is almost similar to that of landlords and proprietors who are generally well sheltered; in these the attacks do not recur except when they have been directly exposed to the aforesaid debilitating conditions, while labourers, on the contrary, are subject to continual attacks. It has been noted that numerous cases come to the hospital for treatment during rainy, cold, and damp weather, especially when such weather comes on suddenly, while in the patients who have been some time in the hospital, well nourished, clothed and sheltered, in short, not exposed to inclement changes, the attacks are the same as in normal weather. I have also noticed that every time a sudden change of weather has caught the convalescent patients in the garden during the hour of recreation, there has been a considerable and rapid increase among all the patients exposed to the said change of weather, though only for a short time. The same thing occurs among the landlords and proprietors; if, as an exception, they

expose themselves to any of these debilitating causes, the period of latency is then considerably shortened, varying from five to nine days as among the labourers; and this in spite of their nourishment being very much better than that of poor labourers, and in spite of their being better able to follow the quinine treatment, their easier circumstances enabling them to call in medical assistance more easily than the poor labourer.

# (2) Cases of Malignant Tertian not Treated with Quinine.

My observations with regard to attacks of summer malaria not treated with quinine have been few, as the severity and aggravation of the symptoms called for the most energetic therapeutical intervention. I may say, however, that upon 3,704 cases I was able to follow 44 who had never made use of quinine, and these patients suffered the attacks although they were in the hospital, far from the common predisposing and determining causes. All suffered attacks within a period varying from five to eleven days, as appears from the following table.

Duration of latency (in days) in cases of summer malaria never treated with quinine:—

CASES	s.	DURATION OF APPREXIA.		
9		 		5
1		 		6
5		 		7
1		 		1
7		 	111	9
1		 		10
1		 		11
1		 1.6.		12
1		 		13
1		 		14
1		 		15
1		 		16
2		 	,	17
6		 		18
1		 		19
3		 		20
2		 ***		21

Total, 44 patients who had never used quinine.

From the table it appears that the duration of latency in summer malaria in patients not treated with quinine varies from five to twenty-one days, and that the attack recurs most frequently in a descending line, on the fifth, ninth, eighteenth, seventh and twentieth day of apyrexia, while the intervening days show a minimum. From the observation of these cases it may be gathered that the period of latency is not of uniform duration in every individual. Indeed, out of fifteen patients who were under observation for more than two attacks, in only one did the attacks recur constantly on the ninth day of apyrexia, and this in six successive attacks.

# CHAPTER 4.—CONCLUSIONS.

(A) Malignant Tertian.—The duration of latency in shortly recurring attacks varies from a minimum of five to a maximum of nine days, which is also the usual duration of the period of incubation. We

further observe that there is another maximum of attacks on the sixteenth and eighteenth day, but in such cases the attacks or the development of the parasite may also have occurred towards the ninth day, but with symptoms and biological phenomena which are not open to observation.

This occurs even in spite of the quinine treatment.
(B) Spring Tertian.—The period of latency in shortly recurring attacks is from five to eighteen days, which is about the period of incubation.

The accidental factors mentioned elsewhere affect and shorten the period of latency.

(To be continued.)

THE SIGNIFICANCE OF BLUE PIGMENT SPOTS.—Dr. Baelz, of Tokio, seems to have made a discovery of great interest in anthropology. Others before him had noticed the blue spots which Japanese babies have on the lower part of their spine and elsewhere, and which usually disappear before the age of 6, but no one before him, so far as is known, had interpreted and set forth this phenomenon as a peculiarity of the yellow race in contradistinction to the white race. In Korean and Chinese children, in Malays and Eskimos, these blue spots have also been found. They are not visible on European children, but the pigment cells have been found microscopically. Baelz says: "The white, the yellow, and the black man have all the same kind of colouring matter in their skins; the difference is only a matter of degree. In the white the pigment does not show, or hardly shows at all, to the naked eye; in the yellow it is a little more abundant, hence the yellow tint; and the more abundant it is, the darker the skin will look until we reach the negro." In Euro-Japanese children, if the offspring resembles the fair-haired, blueeyed parent, it has no spots at all; if the influence of the Japanese and the foreign parent is about equal, the spots are there though more or less indistinct. But if the Japanese characteristics prevail generally, the spots are almost as well marked as in a Japanese baby. While apes have the same blue spots, and certain monkeys blue callosities on the buttocks, Japanese children have sometimes one-half of their bodies covered with them. Dr. Baelz believes that the blue spots form a most important racial characteristic, and will not acknowledge that the configuration of the eyelids or of the earlobes is of anything like equal value.—The Nation.

The scientific expedition being sent out by the London School of Tropical Medicine to Uganda to study sleeping sickness will start in a few days. In our notice of this expedition Dr. Low's name was printed in error as Dr. Lord. Dr. Low holds the Craggs Scholarship of the London School of Tropical Medicine, and his previous record of work at home and abroad testifies to the wisdom of selecting him to take charge of an expedition of the kind.

ANTI-TYPHOID INOCULATION.—The reply given in the House of Commons to enquiries concerning the results of anti-typhoid innoculation was that a report of under 5,000 cases had been received, but that the results were not sufficiently conclusive to justify any official statement on the treatment.

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THE

# Journal of Tropical Medicine

June 2, 1902.

# POPPY CULTIVATION IN INDIA.

THAT most indefatigable body, the Society for the Suppression of the Opium Trade, has again been showing signs of activity. In December, 1901, the Society addressed a memorial to the Prime Minister, calling his attention to the policy followed by the Indian Government of late years of largely extending the cultivation of the poppy in British India, notwithstanding numerous and express pledges on behalf of successive Governments in this country that no such increase should take place, but that, on the contrary, this cultivation should be diminished.

The memorial was also sent to the Secretary of State for India.

The Society in specific terms accuses the British and Indian Governments of deliberately neglecting their promises. A grave charge, and one which not only British statesmen naturally

resent, but which British people are not likely to accept on mere statement from any Society, however well intentioned.

The reply to this assertion, given by Lord George Hamilton, the present Secretary of State for India, is at once definite and conclusive, namely, that he "cannot admit that there is any pledge of this kind which is operative at the present time or binding on the Government."

We are, as a people, accustomed to rely on the word and pledges of our statesmen, and we are not prepared to throw over the traditional good faith of our rulers. The members of the Society seem, however, to take for granted that these high officials are not speaking the truth, and expect the public to believe their word as against cabinet ministers.

What is it that the Society wants to do? There are two distinct questions mixed up in their demands. One is that, by recognising the opium traffic, the Government of India and the British people generally are guilty of a "national sin," by deriving revenue from an article which is poisoning the Chinese. The second factor in the argument is the harm that is being done to the Chinese as a people, by the consumption of opium. These are two wholly separate problems. Government can cease the exportation of opium to China, but by so doing can we save the people of China from being "poisoned" by opium? We cannot prevent the consumption of opium in China by stopping the supply from India. The Chinese are cultivating the poppy extensively, and it is only a question of time how soon the Indian supply will cease from the want of demand.

The Indian Government, being therefore incapable of dealing with the growth or consumption of opium in China, is therefore only guilty of the "national sin" of producing and trafficking in a deleterious commodity. If governments are to be held guilty on such grounds, then is every government past and present to be attainted on such purist terms.

Any government deriving a penny of income from any wrongly used substance or article which affects the national health is guilty of a "national sin" when adjudged by such a tribunal. Alcohol on this plea should go duty free if a government is to remain guiltless; every person who commits suicide or injures another in anyway, by any of the poisonous vegetables or metals used in the arts from which government derives income by taxation, can lay the blame on the individuals who hold the reins of government for the time being for allowing the use of such materials. Granted such premises, then mankind is the sinner, for all peoples that dwell on the earth come under the ban.

If the Society is struggling to lessen the amount of opium consumed by the Chinese or any other race of people, they will have not only the Chinese themselves, but all civilised and uncivilised communities with them. If, however, they are attempting to set up a code of national morals based on the opium exportation from India alone, they cannot expect public support. The loophole given the Society at the present moment is the fact that during a period of excessive supply (1888), an unusual stock of opium caused the government of India to restrict the area of poppy cultivation, and during the seven subsequent years, owing to bad crops, &c., the quantity continued below the average. Afterwards, when the market improved and the crops gave better yield, the quantity exported again reached the normal average. It is this apparent increase which gave the Society for the Suppression of the Opium Trade an opportunity of publicly accusing the Governments of Great Britain and India of insincerity. The interference may be opportune, the motive may be good, and we have no doubt as to the purity of the humanitarian principles involved, but we do wish to have this question discussed on a rational basis and not to make it a subject of mere acrimonious discussion; one in fact in which Government officials are flouted as consummate liars.

Can we save the Chinese as a people from the deleterious influences of opium is a question which all right-minded people will be willing to take part in. It is not to be done by stopping the supply from India. The quantity sent from India to China is a mere bagatelle to the actual

quantity grown and consumed in China. Nor can we by accusing our rulers help the Chinese. Other methods must be tried. What these may be cannot be settled off hand, but did the Society, which has devoted so much pains to injure the reputation of the officials of their own people by publicly accusing them of falsehood, turn their attention to the real evil, and direct our energies to lessening the deleterious influence opium causes in China, they will have the support of every right-minded person. The "national sin" may be with us, but the physical and moral harm is to the Chinese, and the two questions have no direct or indirect bearing.

# Translations.

# GEOGRAPHY AND HISTORY OF LEPROSY IN CRETE.

By Dr. Ehlers (Copenhagen).

Abridged translation from the French, by P. Falcke.

THE island of Crete is considered to be one of the prettiest of the Mediterranean islands, and although possessing a chain of lofty mountains it has no large water-courses. The water is supplied by numerous torrents from the mountains, which are fed by the torrential rains and by melting snow. These torrents water the plains during the winter but run quite dry during the summer.

Pits and springs provide potable water to the inhabitants of the plains, while the residents of the mountains are forced to store rain water in cisterns or to use snow water.

The climate of Crete is much cooler than that of Cyprus, Malta and Algiers, though in the same latitude.

# THE SANITARY ENVIRONMENTS.

The people of the towns live in dark lanes, so narrow that the sun is rarely seen, and most of the houses, dating back to the time of the Venetians, do not by any means conform in hygiene to the requirements of civilisation.

The population of the villages are still more disadvantageously situated as regards sanitation. Their dwellings, most of which are in the centre of plantations, are low, dark, dirty and damp. It is almost impossible to obtain fresh meat and the diet of the villagers is almost exclusively vegetable, consisting of ripe fruits, vegetables, rye bread, a quantity of oil, and a sort of brandy made of the dregs of wine (Raki).

In consequence of these unhealthy conditions the people are far from healthy and suffer greatly from the effects of endemic malaria, which is particularly prevalent in the valley of Rethymno and on the plain

of La Canée. They are also subject to leprosy, which has been endemic on the island from time immemorial. It is impossible to trace back the genesis of leprosy on the island, but the disease was probably a heritage from the Phænicians; for Galène, Ætius and Celse unite in designating it as "the disease of the Phænicians."

## DATA AS TO THE NUMBER OF LEPERS.

The first author who mentioned leprosy in Crete was Savary (1779), who expresses himself on the

subject as follows :-

"This beautiful country is cursed with a disease which, though less dangerous to life than plague, is more repulsive. Syria was the ancient centre of leprosy, and was thence communicated to several islands of the Archipelago. The disease is contagious, and is immediately transmissible by the touch. Lepers are relegated to little huts built by the wayside, and are prohibited from leaving them and communicating with anybody. They usually have a little piece of ground where they cultivate vegetables and keep fowls; by these means and the charity of passers-by they drag out a miserable existence.

Rich persons are not attacked by this disease; the lower classes, and more particularly the Greeks, are most subject. The Greeks strictly observe the four fasts, and during the whole of these periods they eat nothing but salted fish, boutargue (fish roe salted and smoked), olives preserved in brine, and cheese. They also drink a large quantity of the native coarse, hot wines. I am of opinion that the reason the disease is not found amongst the well-to-do Turks, nor amongst the Greeks living on the mountains, is that the former eat meat, rice and vegetables throughout the year, and the latter eat principally fruit, vegetables and milk foods."

Sieber, the botanist, 1814, also mentions leprosy. He first saw the disease at the fort of Candia, where a suburb was put apart for their occupation, and they were prohibited from entering the town, and this was the custom in the three largest towns on the island. At that time leprosy was so prevalent that there were one or several lepers in each of the 600 or 700 villages. They were permitted to live in common with other persons until their skin was covered with eschars and their fingers began to fall off, when they were sent to the "leprochorion" (leper village).

Captain Spratt (acting Admiral of the English Navy) was the next person to study leprosy in Crete (1851 to 1853). He mentions that at that time 111 lepers, members of 70 families, of which 32 were Mussulmans, lived in the leper suburb of Candia. He describes their manner of living, and says that the population believed that the disease was contagious. There were 100 lepers in the leper village outside Hierapetra. Dr. Smart, who was probably the medical officer on board Captain Spratt's ship, mentions that the total number of lepers on Crete, according to his computation, was at least 900

Dr. Hjorth (1816 to 1861), the principal sanitary officer of Crete, expresses himself as follows: "Leprosy attacks a relatively large number of the population.

It is difficult to indicate the initial cause, the inhabittants of various districts living in almost an identical manner; but the greater part of the lepers live in the mountains of Sphakia and Selino, where snow water is almost exclusively drunk." Hjorth gives the total number of lepers in the island in 1853 as 578.

Dr. Brunelli, in an important work on leprosy in Crete, computes that in 1863 there were only 400

lepers on the island.

# LIABILITY ACCORDING TO RACE AND DIET.

Dr. Varoncha, of Canée, who practised medicine in Crete for fifty years, observes the Mussulmen are less subject to the disease than Christians, and that some localities are notorious leprosy centres, while other places quite near by are immune. His conclusions summed up are as follows: "The disease is not contagious at first, he therefore does not consider it necessary to isolate the victims till at a more advanced stage. The patients should be nursed by old persons, who are not so liable to be infected. He is of opinion that it is dangerous to have intercourse with lepers suffering from diarrhæa or ulcers. The patients should be taught to follow hygienic principles, which they unconsciously neglect."

Dr. Varoncha, moreover, believes that the disease is extending on the island, a circumstance that is due to the personal uncleanliness of the Christian peasants, as also to their abuse of wine and "raki" (brandy), and their excessive use of pork, which they eat fried in rancid oil.—(Lepra, Bibliotheca internationalis,

1901, vol. ii., No. 3.)

# Current Miterature.

# ASSOCIATION OF AMERICAN PHYSICIANS

Seventeenth Annual Meeting, held in Washington, D. C., April 29th and 30th, 1902. J. C. Wilson, M.D., of Philadelphia, President.

Drs. M. J. Lewis and F. A. Packard, of Philadelphia, presented a report of the cases of thermic fever treated at the Pennsylvania Hospital in the summer of 1901. The total number treated was 91, of which 31 cases were women and 60 men. In 50 per cent. of the cases there was an alcoholic history. In many cases abstraction of blood had been practised, the quantity withdrawn varying from seven to twenty ounces. In no instance did it do any harm, and in many instances it was followed by marked improvement. Saline infusion into the median basilic vein proved useful in some instances.

Dr. Frank Billings, of Chicago, cited a case in which the temperature, on admission to hospital, had been too high to be measured by the ordinary clinical thermometer. After a cold bath the man had gone into collapse, but had been revived, and then the temperature had quickly risen from 100° to 110F°. The man had eventually recovered.

Dr. J. H. Musser said that of six cases having a temperature between 109° and 115°F., two recovered, and in these saline solution had been injected.

Dr. F. A. Packard, of Philadelphia, said it was the

Caducée.

Treatment.

in advance.

opinion of all of those who had seen the saline solution used that more persons had been saved by this procedure than would have been saved without it.

LEPER COLONY IN THE PHILIPPINES.—The island of Kulion, distant from Manilla about twenty hours' sail by steamer, was recently visited by the Commissioner of Public Health and the Sanitary Engineer of the Philippines Commission, to perfect arrangements for the establishment of a leper colony thereon. The island is about twenty miles long, ten miles broad, and contains many fertile valleys suitable for agricultural purposes. It is also well watered and timbered, and well adapted to stock raising. It is the intention of the Commission that the colony, after its establishment, shall be self-supporting. It is expected that about 600 lepers will be established on the island before the 1st of April, though the thorough carrying out of the plan as contemplated will require a number of years.—Boston Medical and Surgical Journal, March 6th, 1902.

#### PLAGUE.

# PREVALENCE OF THE DISEASE.

India.—During the weeks ending April 26th and May 3rd, the number of deaths in India from plague amounted to 17,302 and 15,748 respectively. The cities and districts chiefly affected were: City of Bombay with 589 and 486 deaths from plague; Bombay districts, 1,673 and 930; Calcutta, 577 and 441; Bengal districts, 553 and 473; United Provinces, 806 and 718; in the Punjab, 12,311 and 12,334.

EGYPT.—During the weeks ending May 11th and 18th the fresh cases of plague numbered 29 and 20, and the deaths from the disease, 12 and 13, respectively.

CAPE OF GOOD HOPE.—In Port Elizabeth, during the weeks ending April 19th and 26th, and May 3rd, the fresh cases of plague numbered 1, 3, and 0; there were no deaths from the disease. Port Elizabeth is the only town or district in Cape Colony infected by plague.

Hone Kone.—During the weeks ending May 17th and 24th the fresh cases of plague numbered 31 and 33, and the deaths from the disease, 34 and 33, respectively.

MADAGASCAR.—On May 27th, 8 cases of plague were reported at Majunga, and 4 deaths from the disease during the preceding week.

# EXCHANGES.

Annali di Medicina Navale. Archiv für Schiffs u. Tropen Hygiene. Archives de Medicine Navale.

Archives Russes de Pathologie, de Médec. Clinique et de

Bacteriologie.
Australasian Medical Gazette.
Boletin de Medicina Naval.
Boston Medical and Surgical Journal.
Bristol Medico-Chirurgical Journal.
British and Colonial Druggist.
British Journal of Dermatology.
British Medical Journal.
Brooklyn Medical Journal.

Climate. Clinical Journal. Clinical Review. Giornale Medico del R. Esercito Hong Kong Telegraph. Il Policlinico. Indian Engineering. Indian Medical Gazette. Indian Medical Record. Janus. Journal of Balneology and Climatology. Journal of Laryngology and Otology. Journal of the American Medical Association. La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal. Medical Brief. Medical Missionary Journal. Medical Record. Medical Review. Merck's Archives. New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyclinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo. Sei-i-Kwai Medical Journal. The Hospital. The Northumberland and Durham Medical Journal.

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4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Editors.

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

# The Journal of Tropical Medicine.

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# Original Communications.

# THE CLASSIFICATION OF THE ANOPHELINA.

By FRED. V. THEOBALD, M.A., F.E.S., &c.

THE Genus Anopheles, founded by Meigen in 1818, has now grown to a considerable size, about fifty species being known. Some of these present very close structural features, others very diverse ones. The genus as it now stands is becoming somewhat unwieldy, like Culex, and as there is seen to be such a diversity of characters in these Culices with long palpi in both sexes, I have been compelled to divide them up into several genera. There is a very great difference, for instance, between A. maculipennis and A. pharænsis, between A. argyrotarsis and A. rossii, the differences, in fact, are quite as great as between Panoplites and Culex or Sabethes and Ædes.

In the classification of the Anophelina, I have found, just as in the Culicida as a family, that the scale structure is the best to take for generic distinction. This grouping is based entirely on the scales of the thorax, abdomen and wings. It will be noticed that by these characters a natural grouping is formed, and that it, in the main, tallies with what we know of their larval structure. I do not think, however, that the minute structural differences in the larvæ should be taken as of greater value than specific characters; but it is of interest to find that, on the whole, by grouping by certain characters of the larvæ and certain adult characters we get similar results.

The following genera may be recognised:-

Genus 1. Anopheles, Meigen. Genus 2. Grassia, nov. gen.

Genus 3. Cycloleppteron, Theobald.

Genus 4. Stethomyia, nov. gen. Genus 5. Howardia, nov. gen.

Genus 6. Rossia, nov. gen.

Genus 7. Leverania, nov. gen.

Genus 8. Cellia, nov. gen.

These genera may be tabulated as follows:-

Wing scales lanceolate. . Anopheles. Protho-Wing scales long and .. Grassia. racic narrow lobes Thorax and ab-Wing scales partly large simple domen with and inflated .. .. Cyclolepphairs only; palpi not Prothodenselyscaled racic lobes Wing scales lanceolate.. Stethomyia. mam-

Thorax with narrow, curved scales; Wing scales small, lanceolate abdomen hairy

millated

Abdominal scales on venter only;

..

.. Howardia.

.. Rossia. thoracic scales hair-like ... Thorax and ab-Abdominal scales as lateral tufts domen with and dorsal patches; thoracic narscales; palpi row curved or spindle-shaped .. Laverania. densely scaled Abdomen completely scaled and with lateral tufts ..

Genus 1. Anopheles, Meigen (fig. 1).—Thorax and abdomen with hair-like curved scales, practically hairs; palpi in the 2 thin, not densely scaled; wings with the veins covered with lanceolate scales, which may or may not form spots, which if present are never so numerous as in the other genera. majority are large species.

Type: maculipennis, Meigen.

The following species are included in this genus besides the type: bifurcatus, L.; walkeri, Theo.; punctipennis, Say; lindsayii, Giles; nigripes, Staeger; pseudopunctipennis, Say; stigmaticus, Skuse (?). This genus was formed by Meigen on maculipennis and he included bifurcatus; later nigripes was added. I have therefore retained the genus in the restricted sense for these and allied species.

Genus 2. Grassia, nov. gen. (fig. 2).—Thorax and abdomen with bair-like scales; wings with long, thin lateral vein-scales; the wings are usually much spetted; the majority small or moderate-sized species. Type: rossii, Giles.

The following are included in this genus: superpictus, Grassi; funestus, Giles; rhodesiensis, Theo.; culicifacies, Giles; christophersi, Theo.; turkhudi, Liston; leptomeres, Theo.; gigas, Giles; cinereus, Theo.

Genus 3. Cycloleppteron, Theobald (fig. 3).—Differs from the two former genera, in that the wings have large inflated scales as well as typical lanceolate ones.

Type: C. grabhamii, Theo.

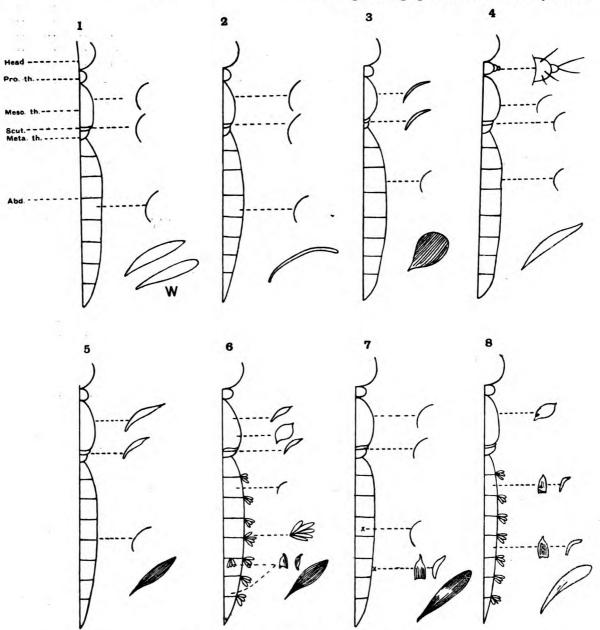
Two species only are known in this genus, the type and C. mediopunctatus, Lutz (ms).

Genus 4. Stethomyia, nov. gen. (fig. 4).—Thorax and abdomen hairy and bristly; prothoracic lobes mammillated; wings with narrow lanceolate scales, and the head with a median patch of flat scales. Palpi of the ? very thin.

Type: S. nimbus (n. sp.).

The genus contains only one species, readily separated by the head scales, mammillated prothoracic

lobes and very thin palpi.
Genus 5. Howardia, nov. gen. (fig. 5).—Thorax with narrow curved scales; abdomen with hairs, no scales; wing-scales small and lanceolate; wings much spotted; palpi of the ? moderately scaled.



THE CLASSIFICATION OF THE ANOPHELINA.

1, Anopheles; 2, Grassia; 3, Cycloleppteron; 4, Stethomyia; 5, Howardia; 6, Laverania; 7, Rossia; 8, Cellia. (Showing general squamose characters.) W, Typical wing-scales.

Type: costalis, Low.

This genus includes besides the type, the following: longipalpis, Theo.; minimus, Theo.; atratipes, Skuse (?).

Genus 6.—Rossia, nov. gen. (fig. 7).—Thorax with hair-like scales; the abdomen with ventral and apical scales; wing scales broadly lanceolate; palpi densely scaled in the ?, and also the proboscis.

Type: sinensis, Wied.

This genus includes also all the sub-species of sinensis (annularis, V. der Wulp; nigerrimus, Giles; indiensis, Theo., and pseudopictus, Grassi); barbirostris, V. der Wulp; paludis, Theo.; bancroftii, Giles. Genus 7. Laverania, nov. gen. (fig. 6).—Thorax

with narrow curved and spindle-shaped scales; abdomen with lateral tufts of scales, with ventral scales and sometimes dorsal patches; wing-scales bluntly lanceolate; palpi densely scaled; legs mostly banded and spotted with white, the hind tarsi being often pure white.

Type: argyrotarsis, Rob. Desv.

This genus contains besides the type, the following: argyrotarsis, sub. sp. albipes, Theo.; fuliginosus, Giles; jamesii, Theo.; maculata, Theo.; lutzii, Theo.; theobaldi, Giles; metaboles, Theo.; annulipes, Wlk. (?); masteri, Skuse (?); maculipalpis, Giles; kochii, Donitz; punctulatus, Donitz; leucophyrus, Donitz (?).

Genus 8. Cellia nov. gen. (fig. 8).—Thorax with flat, spindle-shaped scales; abdomen entirely covered with scales and with dense lateral tufts; palpi of ? densely scaly; wing-scales large, bluntly lanceolate,

wings densely scaled.

Type: pharensis, Theo. This genus also includes the following: pulcherrimus, Theo.; squamosus, Theo.; bigotii, Theo.

# PECULIAR MARKING OF THE TONGUE IN ANKYLOSTOMIASIS.

By Percy H. Delamere, L.R.C.P., L.R.C.S.I. Government Medical Officer, Leguan, British Guiana.

In a letter addressed to Dr. Manson, Dr. Delamere writes: I am sending you an account of a symptom in ankylostomiasis, which I have observed in about fifty or sixty cases among the coolies on the two estates I have charge of in this island, as I do not see it mentioned in the books on the subject. I refer to a peculiar marking of the tongue. There is a large amount of ankylostomiasis in this island. I had fifty-one cases in one estate hospital during the twelve months from April, 1901, to March, 1902, and have eighteen cases under treatment now. Some little time back I began to notice that all the patients under treatment for this disease had a peculiar mark on the tongue, exactly as if the patient had just wiped a penful of Stephens' blue-black ink on his tongue; in fact, the first time I did take notice of it, was to ask the nurse why he let the patient play with the pens on the ward desk. The man said he had not, and that his tongue had been marked like that for a long time. A few days after, another man came in

a markedly anæmic state with a blue-black mark on his tongue; he also had ankylostomiasis. I then commenced to take notes, and found that all patients who had passed ankylostomes after treatment had more or less marked tongues. I even went further; we have a monthly inspection of new coolies on each estate during the first twelve months after arrival from India. I examined the tongues of every one of them and found fourteen who to look at were perfeetly healthy; no anæmia, nor in fact any sign of disease, but who had blue-black marks on their tongues. Most of the cases said they had come from India with these marks; in fact, one man said his tongue was marked like that from childhood. I took them all into hospital and put them on the usual thymol treatment and every one of the fourteen passed mature ankylostomes. I now make it a rule that everyone with these marks on the tongue gets thymol even if no anæmia is present, and in no case have I failed to find ankylostomes. I have made an attempt to sketch and paint the tongues of the cases I have now under treatment in the hospitals, but please excuse the result, as I have no proper paintbox or colours, so have had to make the colour of tongue far too bright a pink, but the small patch of colour at the bottom of each group of tongues, I wish to represent the colour of a healthy tongue. The blue-black colour I have got more like what it should be, and the brown marks are like the colour of lightlyroasted coffee when first ground.1

It must also be noted that the edges of the marks are not so sharply defined as they appear in my sketches, but fade away into the red of the tongue. I find that under treatment, thymol repeated two or three times, and large doses of tincture ferri. with a little quinine, that in from ten to twenty days the small marks have gradually faded away beginning from the edge and getting smaller. The large ones

take six weeks or more.

I intend taking further notes, as if this is a regular symptom here of ankylostomiasis it is well worth making public, as it is an early sign I take it, before there is pronounced anæmia, and of such easy diagnosis that cases can be treated and cured before there is much damage done. I have had no opportunity of

making sections of these patches.
Fig. 1.—Male, aged 28, taken into hospital on account of tongue, which is healthy-looking, but with five small blue-black marks. Organs normal; passed several worms after thymol treatment. Marks faded

after thymol.

Fig. 2.—Male, aged 20, shows no signs of disease. Organs normal; tongue healthy looking, three small marks blue black; passed worms after thymol.

Fig. 3.—Male, aged 34, was in a very weak anæmic state; face puffy; legs swollen; marked jaundice; urine no albumen; heart dilated, complains of palpitation; tongue dirty yellowish clay colour, with blueblack edge; treated with thymol; passed large quantity of worms. Very much improved. Tongue changing colour.

<sup>[1</sup> We found it impossible to represent these colours accurately, so we have been content to indicate the situations of the markings merely, see illustrations.—Editor.]

Fig. 4.—Male, aged 20. No anæmia; organs normal; tongue pinkish, not quite normal colour; taken into hospital on account of tongue; has one large and two small blue-black marks; passed worms after thymol. Very much improved; marks fading.

Fig. 5.—Male, aged 29. Slight anæmia; tongue a little pale, with two blue-black marks; passed worms

after thymol. Marks fading.

Fig. 6.—Male, aged 20. Slight anemia; organs normal; tongue a little pale, with three blue-black marks; passed several worms after thymol. Very

much improved; marks fading quickly.

Fro. 7.—Male, aged 29. A thin man, but no anæmia; organs normal; tongue normal in colour, with three very large marks, blue-black in colour and the edges fading away into red of tongue. Has no cedema; urine normal; passed large quantity of worms. Much improved, but marks are fading very slowly.

Fig. 8.—Male, aged 19. Not anæmic; organs normal; tongue healthy looking, with five small blueblack marks on tip; passed ankylostomes after thymol. Discharged cured, with marks quite faded.

Fig. 9.—Male, aged 19. Marked anæmia; no cedema; colour of face faded in patches; tongue pale, and has a very large blue-black mark on one side, and a smaller one on the other; passed ankylostomes after thymol. Very much improved.

lostomes after thymol. Very much improved.

Fig. 10.—Male, aged 25. Thin, wretched-looking man; well-marked anæmia; palpitation; no ædema; urine normal; has lost colour in face; tongue yellowish pink, the marks in this case are brownish with darker brown minute spots, like ground coffee; has passed ankylostomes three times after repeated doses of thymol. Very much improved; spots less brown.

Fig. 11.—Male, aged 25. Anæmic; organs normal; no ædema; tongue light pink, one large and two small marks, but of a washed-out black colour (not blue-black); passed ankylostomes after thymol.

Improved.

Fig. 12.—Male, aged 30. Very weak and anæmic; lost colour badly about face, and is puffy; cedema of feet; tongue very pale, four small brown marks (nearly same as fig. 10); passed large quantity of ankylostomes after thymol.

Fig. 13.—Female, aged 22. Thin and anæmic; lost colour in patches on face; organs normal; tongue pale, both sides marked blue-black, some parts darker than others and edges run into red of tongue; passed ankylostomes three times. A little improved.

Fig. 14.—Female, aged 30. Very thin, anæmic woman; lost colour about face; tongue pale, with two very large blue-black marks; passed ankylostomes several times after repeated thymol. Slow improve-

ment.

Fig. 15.—Female, aged 25. Very anemic; face puffy; palpitation; no albumen; no ædema of legs; tongue yellowish pink, with many very fine brownred spots at tip; passed ankylostomes twice after

thymol. Spots fading.

Fig. 16.—Female, aged 24. Not anæmic; healthy looking; tongue bright pink, there is one large coffee-coloured mark, with small dark red-brown spots about it at side of tongue and a small one in middle; passed ankylostomes. Slow improvement.

Fig. 17.—Male, aged 25. Thin, anæmic condition; lost colour about face; palpitation; no cedema; tongue pale, one small blue-black mark; passed few ankylostomes. Nearly well; spot fading; general condition much improved.

Fig. 18.—Male, aged 21. Weak, thin, and very anæmic; palpitation; no ædema; tongue yellow-pink; three large marks, blue-black, but darker in some places than others; passed large number of ankylostomes.

Very great improvement.

# QUININE IDIOSYNCRASY LEADING TO HÆMOGLOBINURIA.

By Aubrey Hodges, M.D.Lond., M.R.C.S., L.R.C.P.

Medical Officer Uganda Protectorate.

The following case would seem to be pretty clearly one of quinine idiosyncrasy leading to hæmoglobinuria, and a short account of it may therefore prove of

interest to your readers.

Mr. S., a German, came under observation on November 10th, 1899, suffering from malaria. He had been two years in tropical Africa, and had had a good deal of "fever." Having heard much of Dr. Koch's theory of the relation of quinine to blackwater fever, and having also been told by his German doctor that quinine produced blackwater fever, he had sedulously abstained from taking the drug. But on one occasion when he was very bad with malaria, about a year ago, he had taken half a gramme of the sulphate, a few hours after which he passed black urine. The next urine he passed was clear, and in two or three days he was quite well. He had now had daily attacks of fever for several weeks.

When seen he was extremely anæmic, with waxy pallor, and the spleen was considerably enlarged, bu what troubled him most was the persistent vomiting, so that he could not retain nourishment, and was

become very thin and weak.

He had been in the habit of taking methyl-blue as substitute for quinine, of which he had so great a horror that he could not be persuaded to try it. He was ordered nutrient enemata and was put on full doses of methyl-blue for two days, and then Warburg's tincture was tried. On November 15th, as there was no improvement, after consultation with his German colleague half a gramme of quinine sulphate was mixed with his morning enema without his knowledge. About mid-day he passed half a pint of portcoloured urine with a trace of albumen, but there was no alteration in his general symptoms, and the next urine passed, after five and a half hours, was normal. I determined to continue the quinine, and gave half a gramme daily for two more days, not only without recurrence of hæmoglobinuria but with distinct benefit to the general condition of the patient. I then gave half a gramme twice daily, still in enema, till at the end of the week he was much better, vomiting had ceased, and he was able to take food by the mouth and enjoy it. He was then told that he had been taking quinine, and readily agreed to take half a gramme twice daily by mouth for a week. At the end of that time he was able to start on a long journey, taking a supply of quinine with him and having directions to continue taking half a gramme

daily for at least three weeks.

He returned on January 15th, 1900, in good health, but shortly afterwards he had two sharp attacks of malaria, during which he was freely dosed with quinine without any recurrence of hæmoglobinuria.

The plasmodia found in this case are described as small discoid and ring forms. No pigment was seen

and no crescents found.

# THE SLEEPING DISEASE (Doenga da Somno).

From the Portuguese.

REPORT SENT TO THE PORTUGUESE MINISTER OF MARINE BY THE SCIENTIFIC COMMITTEE SENT TO STUDY THE SLEEPING SICKNESS IN WEST AFRICA, ON FEBRUARY 21ST, 1901.

(Continued from page 172.)

# PART III. (condensed).

THE microscopic investigations were made on specimens taken from various parts of the nervous system. Some of the specimens were placed in absolute alcohol, some in Müller's fluid; sometimes they were treated by other methods, including impregna-

tion by paraffin or cellordina.

The diplo-estreptococcus was found to exist in notable quantities in the vessels of the pia mater, in the lymphatic sheaths of the vessels of the cerebral and medullary capillaries. The glands at the bifurcation of the trachea exhibited numerous diploestreptococci. The preparations made by the method of Weigert did not show any nervous fibres in a state of decay or degeneration.

#### BACTERIOLOGY.

The only parasite constantly found in our investigations, made during life and post mortem, was the diplo-estreptococcus; the principal characteristics of

this micro-organism we give below.

The preparations were made from the liquid obtained from lumbar punctures taken during life or at the autopsy. The micro-organisms were found disposed in pairs, more or less round in shape, sometimes slightly elliptical. The adjacent surfaces of each were slightly flattened, rendering the cocci somewhat hemispherical, so that they presented an aspect analogous to the cocci of Neiss, and to the diplococcus intracellularis meningitivis of Weichselbaum; usually there was a clear aureola round them, slight, but nevertheless quite perceptible. These diplococcic forms were not usually observed in the fluid drawn off during life; but in fluid examined from bodies ten or twelve hours after death it was observed that many of the diplococci formed themselves in chains of two, four, eight, or more.

In the majority of cases the micro-organisms were free to move in the secretion. Rarely do any occupy the protoplasm or nucleus of the cellular elements. The diplococci are, as a rule, more frequently found in the cerebral secretion than in the spinal fluid; although in some cases they existed equally in both.

They are easily stained by various aniline dyes, for example, by the alkaline blue of Loeffler, or the phenicated thionine of Nicholle. Treated by Gram's method (we stain them generally by a modification of the Nicholle system), their behaviour is irregular, some taking the colour, others not, and some to an intermediate extent, so much so that in the same chain of diplococci the cocci may be stained of diverse tints. After one or two experiments on the cultures I made-especially on the solid ones-I obtained uniform results by the Gram-Nicholle method. The diplo-estreptococcus generally cultivates very badly in all the ordinary media. In the meat extract, or "agar," or mushroom, simple, or with glycerine, they generally fail every time. The liquid proposed by Martin for the culture of the bacillus of Loeffler, and obtained by macerating the stomach of the pig, gives very much better results, especially if we make it solid by the addition of "gelose." The best solutions are those containing ascitic fluid, for example, a mixture of this liquid with the extract of meat in equal parts; or the medium recommended by Kiefer for the cultivation of the gonococcus, substituting the extract of beef for the macerated solution of the pigs' stomach, or mushroom.

In the liquid medium containing the peritoneal secretion there was noticed in eighteen to twentyfour hours, at a temperature of 35° to 37° C., the appearance of growths not very abundant, but manifesting themselves by a slight turbidity, generally of a uniform nature. This turbidity increases consecutively, but without attaining a great degree. At the end of four or five days there is a small sediment of the bacteria visible in the bottom of the glass, and the liquid becomes very much more limpid. In Martin's cultivation medium we saw the same phenomena, but in a greater degree. In "solid" extracts, to which I have referred above, there began, at the end of twenty-four hours and at the same temperature, to be visible, small, round, or oval colonies of a greyish white colour, very transparent and with a somewhat brilliant surface. Their growth at the end of the third or fourth day never exceeded 0.2 mm. to 0.3 mm. Observed under the microscope with a very low power they present themselves as composed of very small granulations, possessing folds but not clearly marked. Later on it is easy to distinguish two zones, one central, of a darker colour, the other at the periphery. When the crop is abundant we see them join together in a partial manner at certain points. With gelatine we never succeeded in obtaining cultures. The preparations made from cultures from various morbid products varied a little, according as they were treated as solids or liquids. In the solid medium numerous chain-like forms appear by the side of the micro-organisms disposed in pairs and isolated one from another. The chain-like forms are always easily recognised, and represent the diplococci. The dimensions of the diplococci vary between 0.7 µ to 0.8 µ, but including the aureola, they attain the size of  $2.5~\mu$  to  $2.7~\mu$ . They are always in a quiescent state.

The diplo-estreptococcus, which we have described above, had never, so far as our investigations go, any great pathogenic power on animals. The "cobaias," injected in the peritoneal cavity, and the pidgeons

in the pectoral muscles, resisted large doses of recent cultures. Rabbits and mice were, however, quite sensible of the effects: they were sometimes killed outright.

With 1 cc. to 2 cc. of the culture, of twenty-four or forty-eight hours' growth in liquid medium with peritoneal secretion, death supervenes in a period of from two to seven days; the micro-organisms were found in greater or lesser number in the blood and in the spleen. In the mouse the doses of 0.5 cc. to 1 cc. of the culture of meningeal secretion, for example, innoculated under the skin, caused death by septic poisoning at the end of two to four days.

The spleen of the animals which succumbed to this experimental injection remains at the usual size and of the general consistence. There were no morbid microscopic alterations visible, save the renal congestion in the rabbits which resisted the disease for a longer period.

The observations have been made on the liquid obtained from punctures in the lumbar region, on lymphatic glands removed during life or during the autopsy, in the blood taken by an aspirating syringe and sterilised, and in the meningeal fluid from dead bodies. The lumbar puncture was done nine times. In six patients it gave positive results, the bacteria being easily isolated; in three the examination of the direct preparations and the cultures gave negative results.

Our experience has taught us that the fluid from lumbar puncture is the best medium of culture, adding an equal quantity of Martin's extract of double strength, and placing the whole at a temperature of 37° C.

Three times glands were removed during life, from two of which positive results were obtained, and a negative result with the third. We made investigations of a bacteriological nature of the blood of four patients. The blood was extracted by a Debove's syringe sterilised at 120°, and the skin was carefully disinfected. We found abundant growths in the cultures—liquids as well as solids—immediately after the growths appeared and before it had time to separate by means of coagulation.

In the meningeal fluid from dead bodies the diploestreptococci were found in a pure state in thirteen cases in which we made autopsies. We termed the microbe we isolated the diplo-estreptococcus. The first part of the name is justifiable, as it presents itself under the form of a diplococcus with great regularity and frequency. The second termination is justified by the manner in which it conducts itself in the preparations; but we cannot say just now whether or not the micro-organism we describe is or is not a transition type between the microbe of Traenkel and the estreptococcus.

The result of our investigations has led us to the conclusions that: (1) Sleeping sickness is a meningo-encephalic affection; and (2) that it is due to a microbe which we term the diplo-estreptococcus.

THE DURATION OF THE LATENCY OF MALARIA AFTER PRIMARY INFECTION, AS PROVED BY TERTIAN OR QUARTAN PERIODICITY, OR DEMONSTRATION OF THE PARASITE IN THE BLOOD.

By Dr. Attilio Caccini.

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(Translated from the Italian by St. Clair Thomson, M.D.Lond., F.R.C.S.)

(Continued from page 176.)

PART III.

ATTACKS AT LONG INTERVALS.

We have seen that with regard to shortly recurring attacks, it may be generally stated that the period of latency in all three forms of malaria is the same as that of incubation. Let us now proceed to examine the period of latency in attacks recurring at long intervals.

Manson refers to the case of his son who was inoculated with spring tertian in 1900, and had an attack in 1901 after full nine months' complete apyrexia, and this in spite of three months' continual quinine treatment after the cessation of the paroxysms, and without his ever having left London, a notoriously non-malarious place.

That attacks recurring at long intervals may come on after a very long period of apyrexia has long been recognised; and this case of Manson, well-defined as to the nature of the attack, is but a repetition of what has frequently been observed in malarial dis-Its importance, however, is much greater because the same febrile tertian cycle was repeated, and the microscopic examination of the blood revealed the presence of endoglobular parasites of spring tertian in a person to whom the infection had been communicated experimentally, and who had always resided in a non-malarious district, which excludes the possibility of reinfection. It is also clear that in such a case a continued quinine treatment is of no avail, since it did not completely cure the patient, who persevered with it for three months after the disappearance of the paroxysms.

Such cases are not rare. I remember one similar, observed by Professor Bignami in the hospital of Saint Galla in Rome. A patient, after a wound, had an attack of typical quartan fever. This patient had been apyretic for many months, and then suffered an attack after a long interval of quartan infection experimentally provoked a long time before, and treated with quinine for a long while afterwards. Neither could reinfection be logically supposed in the case of this patient, seeing that his condition (hemiplegia) had detained him in the hospital for many months, and he had certainly not moved since he was inoculated with quartan.

It is not a rare case for a medical man to be summoned to the mountains to treat a patient suffering from an attack of malaria after many months of apyrexia, frequently following one of the commonly recognised determining causes. But these cases have not been well studied, and are only mentioned here

and there as among the curiosities of daily medical practice.

In coming to the results of my observations I must

note before all :-

(1) That the period of latency of malarial fever in

general may extend for many months.

(2) That an attack after a long interval does not occur except by the intervention of one of the recognised determining causes noted, and never spontaneously.

(3) That it occurs in spite of all treatment followed, whether temporarily or continued during the whole period of latency, by quinine, arsenic, iron, iodide of potassium, &c., accompanied by good, wholesome, nourishing food, and all the conditions of a healthy life advised at the time.

(4) That the attack is not influenced by age or sex. With regard to the second assertion it may be affirmed that there is no fixed period of latency beyond which the attack cannot recur, on the contrary, every time a person infected with malaria is exposed to one of the recognised causes, the effect is to bring on a fresh access of fever. I have not found a case in which the limit of time exceeded thirteen months (in spring tertian), yet even when that limit is reached, it may be deduced from the cases observed, that the said period would have proved to be much longer if any of the recognised causes of relapse had intervened later.

To come to facts. It is not rare to find persons who, having caught the tertian infection and recovered from the first paroxysm without therapeutic intervention, have returned to districts free from malaria, where some have continued the quinine treatment they had commenced for two or three months. Several months later, returning to a malarial district, these persons, after a few days or hours, have been seized with attacks of a tertian type, though frequently they have continued or recommenced the quinine treatment. Should these be regarded as cases of recurrence?

I think that the majority of such cases should be so regarded, absolutely so in cases where the fever has reappeared after a few hours' residence in a malarious district. It is true that many facts raise a doubt as to whether it may not sometimes be possible to contract true malarial infection in a district previously considered non-malarial, but it would be senseless to admit the theory of fresh infection, especially as in every case the patient suffered from the same form of malaria as before.

It is not difficult to observe these cases in isolated individuals, or in the families of labourers, although many malarial patients in July and August return to their own country as soon as they have left the hospital, and only come down in October, November and December, to attend to the ploughing and sowing of the fields.

# Chapter 1.—Spring Tertian.

In 152 cases of spring tertian studied by me, though during first infection, I observed that the attack recurred within an interval varying from three to four months. In all the 152 cases I can certify that they had not returned to a malarious district in the meanwhile, nor suffered from attacks of fever. I observed that in all these cases the attack came on after the intervention of one of the recognised determining causes. Here follows the principal data respecting the period of latency in these 152 cases.

The attack recurred :-

(A) Within two months from the beginning of apyrexia in 60 cases, and these patients were nearly all overtaken by it while undergoing the quinine treatment.

(B) Within seventy days in 29 cases.

(C) In ninety days in 20 cases.

(D) From the 90th to the 120th day of apyrexia in

the remaining cases.

None of these patients resided in a malarious district after the first apyrexia; in spite of this some of them had afterwards two, three, and more attacks at short intervals; in 102 cases the attack occurred while the patients were undergoing the quinine treatment, which was combined in almost every case with the iron-arsenic treatment.

The following Table clearly shows the results ascertained in the cases of 14 patients who had never taken quinine.

C	Number of ases, Age,	Duration of Apyrexia before attack	Residence during Apyrexia Height	Duration of Apyrexia on Return to Malarious District	Cause of Attack	Duration of Apyrexia after Intervention of Cause of Attack	Season of Attack
(1)	1 man, 26	50 days	Aquila, 721 m.	29 hours	Rain	9 hours	Oct.
(3)	1 man, 40	53 days	Pausola, 500 m.	, 33 hours	Rain	22 hours	Oct.
	1 woman,39 1 child, 10	60 days 58 days	"	"	Cold Under- feeding	"	"
(6)	1 man, 50	69 days	Monte Tancia, 800 m.	45 hours	Rain	About 18 hours	Oct.
	1 woman, 47 1 youth, 20	73 days 68 days	"	"	Damp	,,	"
	2 men, 18-19 1 boy, 12	90 days 88 days	,,, ,,,	"	"	12 hours	"
(3)	3 men,26-30	90 days	Preturo 792 m.	hours	Cold	16 hours	Dec.
(1)	1 boy, 16	92 days	Norcia, 603 m.	30 hours	Wound in ab- domen	hours	Dec.

I further add several very convincing cases which prove that in patients not treated with quinine, in whom the primary infection of spring tertian has spontaneously exhausted itself, the attack recurring after a long interval (within two and twelve months of apyrexia), always comes on after the intervention of

¹ This is known with regard to certain districts; further, in long years of observation I have gathered copious materials from individuals from a mountainous district hitherto reputed non-malarious, who had never been ill and yet were infected with malaria when they left the said district (see "Some Observations on the Epidemiology of Malaria," by Dr. Attilio Caccini.—Policlinico, 1901-1902).

one of the recognised determining causes aforesaid. These cases are specially important, as in dealing with educated and intelligent persons the facts gathered

are more trustworthy.

The case in point is that of a whole family of ten in easy circumstances, six of whom while at Nettuno contracted the infection of spring tertian in July, 1900.

(A) P. G., 50, employee.

(B) P. L., 40, mother of three children.

(1) P. M., 25, employee.

(2) P. R., 20, officer in the army.

(3) P. M., a girl of 17. (C) F. E., maternal aunt, 51.

I was called in to this family by the doctor who attended them, when I made an examination of the blood and collected the information given there. None of them had ever had malaria; after a residence of from fifteen to twenty days at Nettuno all six were seized with fever of a clearly defined tertian type. They removed from Nettuno to a locality in the Alps where they had property, and the attacks ceased spontaneously. F. E. alone (see C) having several attacks at short intervals, stopped them with quinine taken rather irregularly for nearly two months. They remained on their estate for three months and a half and P. R. (see No. 2) was then obliged to join manœuvres in the field. On his first night in camp, fter a long ride, and wet with perspiration, he was obliged to expose himself to the sudden cold of the Within twenty-four hours the attacks of tertian fever commenced and he stopped them with quinine. When the attacks came on it was hardly forty-eight hours since he left his Alpine residence.

The rest of the family returned to Rome towards the middle of November; none of them had suffered from the fever for four months. Towards the end of November P. L. (see No. B) had a fresh attack of tertian fever following a miscarriage, the fever appearing twenty-six hours after the miscarriage. An examination of the blood showed the presence of the

endoglobular parasite of spring tertian.

No. A (P. G.) took part in a swimming race towards the beginning of December and was immersed in cold water for some minutes; thirty-two hours later he had an attack of tertian with the positive presence in the blood of the plasmodium of spring tertian.

No. C had a relapse in December after an attack of

cardiac asthma, to which she was subject.

Of the members of this family who had contracted malaria at Nettuno, that is, six out of ten, No. A and No. 3 remained almost immune. In order to counteract the malarial infection and in the hope of avoiding fresh attacks, the six patients entered upon a severe quinine treatment (1 to 2 grammes a day), which they continued until March 1st, 1901. In July, 1901, the family went to Viareggio; they had only been there three days when every one of the six had an attack—a few hours before they had been swimming and bathing in the sea. It is also to be noted that in the meanwhile (from December, 1900, to July, 1901), they had not moved from central Rome.

Thus the first relapse occurred after about two and a half months of apyrexia in one of these cases, and after four months in three of the others, that is, in

four out of six. In every case the attack followed upon some debilitating cause.

The possibility of reinfection in a mountainous district may be excluded, as only those members of the family were attacked who had contracted the infection at Nettuno, while those members (four) who had not taken the malarial infection at Nettuno or any other place, never suffered from fever, though leading the same kind of life as the other members of the family. The quinine treatment had no effect whatever.

The attack recurring after a long interval exactly resembles true first infection, that is, the paroxysms of fever may be more or less regular; attacks may or may not occur at long or short intervals and it reacts equally against the quinine treatment. But whereas regular systematic treatment prevents attacks recurring at short intervals, it does not prevent those recurring at long intervals, which come on after a space of time which may reach twelve months of apyrexia. The attack always occurs upon the intervention of any of the organically debilitating causes mentioned. Thus with patients treated with quinine and divided into categories according to the method of the treatment, every category shows the same percentage of attacks recurring at long intervals. In every case the attack followed upon the intervention of one of the debilitat-Any patient guarding against ing causes noted. debilitating accidents and observing a regular diet, may remain free from attacks of fever for a long while (six to seven months), but suffers a relapse after that time upon exposure to cold, fatigue, wounds, or illness.

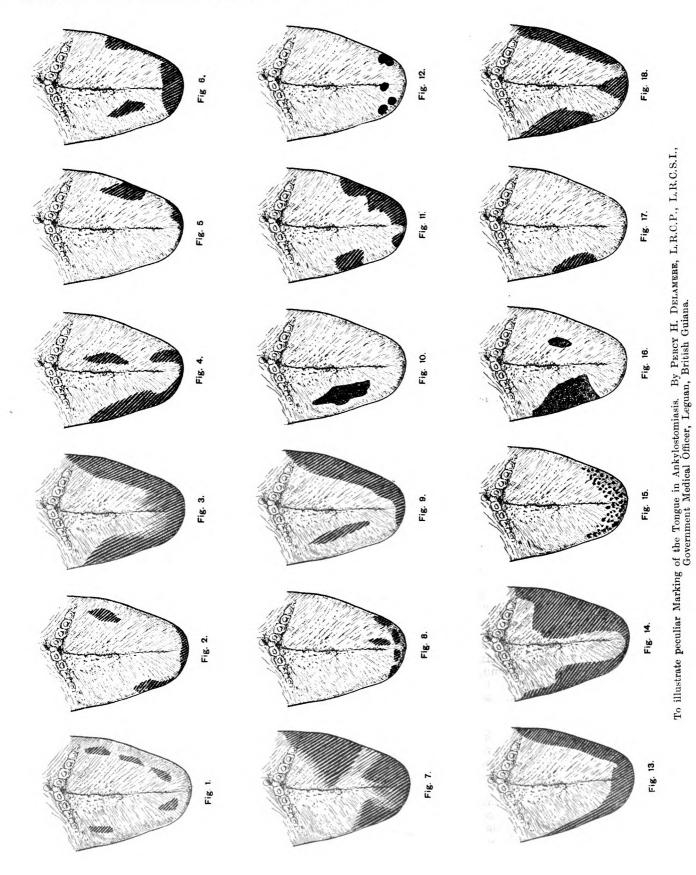
One of the longest examples of latency which I had the best opportunity of studying was the following: Between September 10th and 16th, 1901, thirty-eight Calabrians by birth, presented themselves at the Hospital Santo Spirito, all suffering from spring tertian; their ages ranged from 7 to 60 years; all were of a robust constitution and stokers by profession. They all came from the same place (Valle d'Inferno), a place still noted as very malarious. I was surprised at the identity of the place from which they came, their birthplace and calling; all the patients gave the

same account.

They had reached Rome and established themselves at Valle d'Inferno (where most of them were employed at the Bolognese furnace) only forty-eight hours before. While they were resting, being in a strong perspiration from their labour at the furnace, the whole band (a hundred Calabrians from the same place) were caught in a sudden cold and heavy shower. Immediately after an epidemic of spring tertian broke out among them. They all asserted that the fever broke out within from ten to twenty-four hours after the rain, and barely forty out of a hundred escaped it. The sixty who fell ill had already suffered from tertian fever in the summer of 1900. I then repaired to the spot and collected the following facts.

In July, 1900, a large band of Calabrian mountaineers had contracted spring tertian at Foggin. They returned to the mountains in August and all the patients followed the quinine treatment until the end of December, and with the exception of some who had attacks in August and December, in the majority apyrexia had lasted from the end of August. On September 8th, 1901, that is, fourteen months after

2.5



		J. 45

primary infection, a band of 100 Calabrian labourers were engaged, including 75 of the aforesaid band. They arrived in Rome by rail after a journey of twentyfour hours, on the morning of September 9th. That evening the stokers were divided into two groups.

(A) Eighty-one who were exposed (including 62 of

the aforesaid band).

(B) Nineteen who were under shelter (including the remaining 13 of the said band who had suffered

from malaria the year before).

After the rain the attack recurred exactly in the case of the 62 who were exposed to it. The first cases appeared in the morning of the 10th and increased rapidly on the following days. In the 62 cases apyrexia had lasted :-

(A) In 20 for thirteen months.(B) In 15 for ten months.

(C) In 10 for nine months.

(D) In 12 for eight months.
(E) In 3 for seven and a half months.

(F) In 2 for seven months.

All had continued the quinine treatment for three or four months at a dose of 0.50—1.50 grammes a day, or thereabouts.

This is the most conclusive example I have seen of long interval in spring tertian, apart from the case

private practice already quoted. The period between January and June is specially well adapted for the study of attacks at long intervals when recurrent attacks of all kinds of malaria are most frequent, while the first attacks are unknown, or at least very rare, as proved by the authors,1 and, according to what I have myself observed in four long years devoted to the study of the malaria epidemic among the patients of the hospitals in Rome. Thus I have frequently observed the recurrence of the attack from January to June in persons apyretic from the end of December who had certainly not since resided in a malarious district. In every case it was easy to trace the cause of the relapse.

# Chapter 2 .- Quartan.

I have already mentioned a case referred to by Professor Bisagni in which an attack of quartan after a long interval followed upon a fall many months after the first attack of quartan brought on by inocu-

Other cases were somewhat rare (six in all) in which I was able to study the duration of the period of latency in attacks recurring after many months of apyrexia. However, in all six cases the attack followed a wound, rain, or a chill, and in one case an attack of clearly-defined quartan followed upon recovery from typhoid, and an examination of the blood demonstrated the presence of endoglobular quartan parasites.

In all six cases the attack recurred after six to ten months of apyrexia. But cases of a shorter period of latency were very frequent (one of three months), and calling to mind what I have said previously, and that in all and every case the evidence of some determining cause preceding the attack was clear, it may be judged how rare are the cases of very long latency, for it is difficult for a quartan patient to escape some determining cause for more than two or three months. It is well to remember that in quartan also the attack recurs in spite of quinine, iron and arsenic treatment.

QUARTAN PATIENTS RELAPSING AFTER A LONG INTERVAL.

Description	Date of Infection	No. of Relapses at Short Intervals	Residence and Duration of Apyrexia	Gause of Relapse	Apyrexia after Cause	Date of Relapse
Plough- man, 40	October, quinine 3 months	3 relapses till De- cember	Sondrio, from De- cember to August	Rain	70 hrs.	2 Aug., 1900
Plough- man, 36	June, 1898, quinine 3 months	Relapse, October, 1899	Alps, July to August	Chloro- form	39 hrs.	6 Aug., 1900
Conta- dina, 24	October, 1899	2 relapses November	Sondrio, April, 8 months	Fall from a cart, pregnant 6 months	55 hrs.	6 Aug., 1900
Conta- dina, 16	August, 1900	April from Decem- ber, 2 re- lapses	Central Rome	Enteric	5th day	6 Sept. 1900
Man, 19	August, 1900	April, 8 months,	Central Rome	Bath in Tevere	66 hrs.	7 July, 1901
Plough- man, 32	September, 1900	4 relapses	Pausola, 3 relapses	Excessive fatigue	50 hrs.	22 Sept. 1900

Chapter 3.—Fevers: Summer—Autumnal.

Is there a recurrent attack at long intervals in summer fever?

In all the number of cases studied, I have observed a true attack recurring after a long interval in four patients only. In two of these cases the attack occurred after sixty days of apyrexia and complete health; in the third case after ninety days, in the

fourth after eight full months.

In the four cases the attack came on in the first after a wound, in the second after heavy rain and many hours' exposure to the north wind (tramontana); in both cases apyrexia had lasted sixty days. In the third the attack followed upon a surgical operation (extirpation of inflamed inguinal lymph glands under chloroform) after ninety days of apyrexia; in the fourth the attack came on after bathing in the river, when the patient narrowly escaped drowning, and in this case the fever appeared only twenty-four hours after the accident.

It is well to note, however, that the other three cases belonged to the group of malignant tertians, and in the last case the summer fever was of the quotidian type.

All these observations of mine agree with many facts recently proved, that is :-

That the summer and autumnal fevers are the worst and most dangerous in their symptoms and pernicious

<sup>&</sup>quot; "Papers of the Society for the Study of Malaria." On the annual course of the malaria epidemic.

nature; that they easily recur at short intervals in spite of quinine treatment; they are, however, more easy to be definitely overcome. In fact, though it is very common for patients in summer fever to suffer many recurring attacks in a short space of time after primary infection, it is very rare to find the attacks recurring in spring, and absolutely exceptional to find the summer form after April. If it is possible that in some cases the recurring attacks pass this limit of time it is at least extremely rare to find any manifestation of fever in April, May, and June, and when these occur they are short, non-typical and abortive. I have never found any case of pernicious fever after February, and it is worthy of note that in the hospital of S. Spirito no dead body escapes postmortem examination when there is the faintest suspicion that malarial infection, active or latent, may have had a share in the death. I can affirm with absolute certainty that in 1899 the last serious case of malaria occurred at the beginning of February, the last autopsy took place about the middle of January. In 1900 the last case of pernicious fever was on February 1st, but there was no autopsy of a pernicious case after the middle of December. In 1901, after the grave epidemic of 1900, the last serious relapses occurred when February was well advanced. The last subject of pernicious fever examined was on January 15th.

At present the malaria season, both in S. Spirito and the Campagna, may be said to be over after the middle of November; no case of primary infection has occurred since the middle of October, though some cases of serious relapse with pernicious symptoms still occur; the last autopsy was on November 1st, 1901. This was in spite of preventive measures, for there is nothing to prevent a sudden increase of malaria and pernicious fever, as this year the epidemic has shown great increase in the number and gravity

of the cases.

What I have said is opposed by the fact that it is not rare for a patient to continue all the winter and a good part of spring with the summer parasite in the blood; I have found this in four patients. But not one of them showed in the meantime a feverish temperature or other morbid phenomena which might have led to a suspicion of masked attacks of fever. In all four the examination of the blood yielded a negative result after the beginning of May, and none of them relapsed in the following season.

A fact noted by several observers is that while the new malarial season is imminent there are no cases, or scarcely any, of summer malaria with crescent bodies in the blood; for my part I have never been able to find crescent forms after April, and very few in that month. In May and June, however, I have

never found a crescent.

This does not prevent an occasional case in the country, so Martirano assures us; it is certain, however, that the above are the facts proved by observation among the patients of the hospital; the discrepancy is perhaps due to the fact that patients with crescents do not always have attacks of fever and

therefore do not come to the hospital, and therefore these have not the rest, good food, and treatment, enjoyed by the patients in the hospital, the action of which influences the disappearance of the "gametes' from the circulating blood; while the effect of the labours in the field, on the contrary, is to make them complete the circle, and perhaps provoke a fresh generation, and therefore Martirano found true and real relapses among the country people.

Perhaps, however, the attack will be short and light (in fact, no case of pernicious fever is cited in the spring), and the labourers, bound to the land from which they expect subsistence, will not have recourse to the hospital, even though suffering slightly from It is therefore supposed that conditions of place have no influence, and that the results do not vary year by year; and it seems to me that this should be taken into consideration, since Dionisi, even at the height of the grave epidemic in 1899, could find only one case of crescents, and even these were very scarce, in the whole ofM accarese-truly a strange thing when one considers that upon this lack of crescents and infected Anopheles was to follow the serious malaria epidemic which was to break out in Rome in 1899.

But I do not wish to dwell much upon this here, as in another work to be shortly published, in which I treat of the epidemiology of malaria, and especially of the course of the epidemic as studied in the years 1898, 1900, and 1901, I have set forth these facts in sufficient detail.

All that I have said is simply intended to clearly show that summer fevers, grave in their symptoms and prognosis, are the least obstinate in relapses; and that it is very rare (at least if not exceptional) for relapses to occur after a long interval, especially when spring is well advanced. In contrast to this is the fact that in spring fevers, on the contrary, relapses at short intervals are more frequent, the symptoms less grave, and the cure more obstinate. This may perhaps be explained by the fact that in our climate relapses of slight tertian and quartan are very frequent in the spring (so much so that these complaints are justly called spring diseases), and these attacks, recurring until the beginning of the new season may, every time they occur, exactly resemble true cases of primary infection; whereas this is not the case with malignant tertians, which, at least in my opinion, exhaust themselves in winter and spring.

#### PART IV.

## CONCLUSIONS.

1. Malarial infection admits of relapses at short or

long intervals.

<sup>&</sup>quot;Papers of the Society for the Study of Malaria," vol. ii., p. 249, et seq.

<sup>2.</sup> In attacks at short intervals the period of latency approximately equals the period of incubation, and therefore: (a) In spring tertian varies from one to eighteen days; (b) in malignant tertian it varies from five to eighteen days, but generally occurs between the fifth and ninth day; (c) in quartan the duration of the period of latency is undetermined, for the latency ceases upon the intervention of any of those conditions which we have seen to be determining causes of relapse.

3. Quinine treatment influences the duration of the period of latency to the extent that, in patients who have followed it systematically, the latency reaches its maximum duration, and in these the number of attacks are fewer.

4. The quinine treatment has no influence to pre-

vent attacks at long intervals.

5. Attacks at a long interval invariably presuppose the intervention of a determining factor.

6. In spring tertian the attack at a long interval has a period of latency varying, as far as I could ascer-

tain, from three to thirteen months.

7. In quartan the attack at a long interval is not clearly differentiated from that at a short interval; both are influenced by the kind of relapse and the importance of the intervening accidental factor, therefore the latency does not cease until the appearance of the latter.

8. The attack at a long interval in summer malaria may be said to have a latency varying between two and eight months, always remembering that the maximum limit of eight months was only found by us in one case—that of a patient suffering from summer infection, with fever of the quotidian type.

9. The attack at a long interval is very frequent in spring tertian and rare in quartan (if only because of the difficulty with which the patient can escape some determining factor of relapse, seeing the special obstinacy of quartan infection and its peculiar liability

to relapses).

10. Tertian, spring, and quartan infection are more tenacious and liable to relapses. The prognosis with regard to relapses is much more serious than in malignant tertian, though the symptoms of the latter are more serious and dangerous, the attacks recur readily at short intervals, but there is no relapse at a long interval, or it is most exceptional after two months, apyrexia.

# THREE LECTURES ON BILHARZIA,

Delivered at Kasr-el-Ainy Hospital, Cairo.

By Frank Milton, M.R.C.S. Surgeon to the Hospital. (Continued from page 170.) LECTURE II.

SYMPTOMS AND SIGNS OF BILHARZIA.

Gentlemen,—I have promised to-day to discuss the symptomatology and diagnosis of bilharzia, and I intend to speak of the symptoms peculiar to the various organs commonly attacked by the disease in the same order as I took them when discussing their pathology; for although the disease has a common origin, its symptoms are necessarily widely varied according to the site of its manifestations.

## THE BLADDER.

To begin then with the bladder. The earliest symptom of bilharzial disease of the bladder in the great majority of cases is hæmaturia of a peculiar and characteristic kind. The amount of blood lost is as a rule insignificant, and would probably never be noticed by the patient if it were mixed with the urine as it was passed; but the peculiarity of this hæmorrhage is that the few drops of blood which are lost

are voided either mixed with the last few drops of urine, or else escape from the urethra after the act of micturition is altogether finished, whereby the attention of the patient is caught by the marked difference in the appearance of the last part of the evacuated In a large number of cases the hæmaturia begins without any subjective symptoms, but as a rule, soon after the patient notices the loss of blood he begins to complain of pricking or scalding in the urethra during micturition, together with a sense of pain or weight in the perineum. In a few cases even before hæmaturia is noticed the patient complains of pains above the pubes, which may even extend up into the lumbar region, but this is rare and probably only occurs in those exceptional cases in which the eggs are first deposited in the muscular coats of the bladder instead of, as is usually the case, in the mucous and sub-mucous coats. The amount of blood passed is seldom excessive, even in well-established cases, but it may at times be increased by accidental causes, such as excess in food or drink or overexertion, but this increase lasts only for a short time and ceases with the removal of the cause. Directly depending on the hæmorrhage, however, is another condition which may give rise to most serious symptoms, and that is when hæmorrhage takes place in the bladder to such an extent that the blood cannot be expelled and a solid clot is formed in the cavity. The condition which then arises is most serious, for not only does the bladder become distended with clot, but the urine coming down from the kidneys cannot be expelled, and a condition of acute retention is superadded, and the patient's condition is an The symptoms are those of extremely grave one. retention of urine with great and rapidly increasing distention of the bladder, and unless relieved, and that speedily, the patient passes into a state akin to uramia and dies.

The frequency of micturition is not increased as a rule until the disease has lasted for some considerable time and a condition of irritability has been set up in the bladder, or until secondary changes have occurred and the symptoms of cystitis are added to those due directly to bilharzia. A very large number of patients infected with bilharzia suffer for a considerable time from the characteristic hæmaturia without any other symptom than a certain amount of uneasiness, or it may be even scalding, during micturition, due probably to the different specific gravity of the last few drops passed, and recover and never have any further trouble. Indeed this uncomplicated bilharzia is so common that very many sufferers from it never come under treatment at all, looking upon it as a thing which has to occur in the ordinary course of affairs, and therefore not worth troubling about. The cure in these cases is probably due to the death of the worms and the gradual complete throwing off of the eggs by the bladder. In this connection the question naturally arises as to the longevity of the parent worms, and unfortunately this is one of the many things still unknown in connection with this disease. It is probable that the life of the bilharzia is a long one; those cases which undergo a spontaneous cure are probably cases where a few embryos have been taken in by the host on

some particular occasion and the infection has never been repeated, and in these cases, although the statement of patients, even of the better class, who have recovered are generally very vague, yet most of them agree in putting the period of time during which they had hæmaturia at about two years. Sonsino's case before referred to would put the possible longevity and sexual activity of the parasite at nine years.

#### HÆMATURIA.

The immediate cause of the peculiar form of hæmaturia occurring in this disease would appear to be that the mucous membrane of the bladder being invaded by the eggs is in a state of irritation, and to a certain extent of hyperæmia, the presence of the egg-infarcts also must to a certain extent interfere with its normal resilience and elasticity, thus when the bladder has emptied itself of its contained urine, and has contracted down to its smallest limits, the hyperæmic, thickened, and comparatively inelastic mucous membrane is crushed on itself, some of the superficial vessels are ruptured, and the blood thus extravasated is forced out after the urine. itself in this stage of the disease is as a rule normal in colour and reaction, and if the portion first passed is caught in a separate vessel nothing abnormal is as a rule found in it. If, however, the whole of the urine is collected together and allowed to stand in a conical vessel, as it settles minute flakes and flocculi will gradually be seen to accumulate at the bottom, which on examination under the microscope will be found to consist of red blood corpuscles, leucocytes, epithelial cells and bilharzia eggs entangled in mucus. certain number of cases the hæmaturia after having continued for a time instead of gradually becoming less and finally ceasing, continues and tends to increase, either owing to the presence of an unusually large number of worms being originally present in the victim or to fresh infection, and presently symptoms due to alteration in the bladder, with impairment of its functions, are set up. At first the symptoms resemble those due to vesical catarrh of a not very acute form, thus there is a certain increase in frequency of micturition, an undefined sense of not having completely emptied the bladder after the act, with scalding during the whole time of passage of the urine, with perhaps some little hesitation in beginning. At this time, and as the symptoms would indicate, no irreparable damage has been done to the bladder, but after a further period, which may be shorter or longer, according to the extent and rapidity of the deposition of the eggs, changes are set up in the mucous membrane of the bladder which are incurable, the changes being due to the definite formation of the thickened patches and the commencing organisation of their fibrous tissue. When the mucous membrane has become so far affected that these raised, hardened patches are developed on the one hand and ulcerative fissures are formed in them by necrosis on the other. the symptoms will pass from the comparatively slight ones of vesical catarrh to the more severe ones of cystitis, and often after but a short interval to those of septic cystitis. The septic germs have either been introduced from without by the passage of instruments or else by micro-organisms finding their way

into the bladder up the urethra, whose canal is kept open by the continuous dribbling of small quantities of urine; for when once the bilharzial patches are well advanced the complete contraction of the bladder is prevented, when there will always be a certain amount of urine remaining unexpelled, which keeps dribbling away almost constantly. When once sepsis is developed in the diseased bladder all hope of curing the patient is practically over, for owing to the nature of the affection, with deep ulcers running in all directions into the overgrown and unhealthy mucous membrane, and the presence of a continually renewed supply of putrescible matter, no amount of cleaning with antiseptics, either by means of washing out the cavity or by medication through the blood, can ever exterminate the septic germs when once they have got a hold. The bladder, too, has probably by this time lost most of its functions, that is to say, it can no longer either retain the urine brought to it from the kidneys nor expel it properly by the urethra, and it becomes a mere diverticulum met with by the urine on its passage, whose contents are a foul mass of blood, sloughs, bilharzia eggs and decomposing urine. The inability of the bladder to expand causes it to endeavour to pass on the urine as it enters; the bladder is thus kept in a condition of continual spasm or tenesmus. The patient has now reached the most distressing stage in this ghastly disease; the necessity of trying to empty his bladder is incessant day and night, the scalding due to the passage of the foul, irritating urine along the urethra is both constant and severe, tenesmus is almost con-tinuous owing to spasms of the irritated ejaculatory muscles, there is constant pain in the perineum and above the pubes from implication of the prostate and the bladder walls, and a constant liability to acute retention of urine owing to blockage of the urethral by a slough or calculus. When to all this is added the complication of pyonephrosis from extension of the septic conditions backwards along the ureter, the patient's condition is hopeless indeed. The development of carcinoma, which may take place at this stage, does not add greatly to the patient's sufferings, the only symptom it is likely to give rise to being an increase of the hæmorrhage; but this is only important in that it may hasten the termination of a case which can only end in death.

(To be continued.)

Bubonic Plague.—Joseph J. Curry states that most writers divide this disease into three classes or types: (1) Pestis bubonica, or bubonic plague; (2) Pestis siderans, or septicamic plague; (3) pulmonic plague. Bubonic plague is by far the most frequent type. There is a type called Pestis minor (mild, or walking plague), with very low mortality, cases of which invariably precede epidemics. The invasion of plague is generally sudden, and is often accompanied by a chill, followed by high fever. The onset is quite similar to that of the malarial fevers. Rats are very susceptible to this disease, and often die in great numbers in the course of an epidemic; flies, ants and other insects act as carriers of the plague bacilli. The first and greatest prophylactic measure is cleanliness. Rats and mice should be destroyed. Food and drink should be protected from possible contamination. During epidemics all food should be cooked.—American Medicine, May 31st, 1902.

### Business Motices.

1. - The address of the JOURNAL OF TROPICAL MEDICINE is Messrs. Bale, Sons & Danielsson, Ltd., 89-89, Great Titchfield Street, London, W.

2.—All literary communications should be addressed to the

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3.—All business communications and payments should be sent to P. Falcke, Secretary to the JOURNAL OF TROPICAL MEDI-CINE. Cheques to be crossed London and South Western Bank, Great Portland Street Branch, London, W.

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THE

# Journal of Tropical Medicine

June 16, 1902.

### BRITISH MEDICAL ASSOCIATION.

Seventieth Annual Meeting, Manchester, July 29th, 30th, 31st, and August 1st, 1902.

Section Q .- TROPICAL DISEASES.

President: Sir WILLIAM R. KYNSEY, C.M.G. Vice-Presidents: Prof. Rubert Boyce, M.B. MAX F. SIMON, C.M.G., M.D.

DEAR SIR,—At the forthcoming meeting of the British Medical Association at Manchester it is hoped that the work of the Tropical Section will be as important and interesting as it has been at previous meetings, and we trust that you will assist the Executive to realise this hope.

The following subjects have been selected for

Wednesday, July 30.—"Prophylaxis and Treatment of Beri-Beri." The discussion on this subject will be opened by Dr. P. Manson, C.M.G.

Thursday, July 31.—"Dysentery." The discussion

on this subject will be opened by Dr. M. F. Simon. Friday, August 1.—"Yellow Fever." The dicussion will be opened by Mr. Cantlie.

The Section will meet on each day at 10 o'clock, when the above discussions will be immediately entered upon.

On Wednesday the business will be introduced by a short address from the President, Sir William R. Kynsey.

Drawings, photographs, card specimens, microscopic preparations, or lantern demonstrations illustrative of disease, are always instructive and never fail to excite interest. Those concerned in the work of the Tropical Section are requested to help in this direction.

The following gentlemen have already intimated their intention to take part in the discussions, or have promised papers: Dr. Patrick Manson, Mr. James Cantlie, Major Ross, Dr. M. F. Simon, Dr. Edward Henderson.

Papers have been promised by: Dr. Andrew Duncan, Mr. James Cantlie, Prof. Hewlett, Mr.

P. W. Bassett-Smith, Dr. J. Galloway. We shall be obliged if you will let us know, at your early convenience, if you will be able to take part in any of the above discussions, or if it is your intention to contribute a paper on any subject within the range of the Tropical Section.

It is obvious that presence in England is necessary for a member to take part in person in the discussions, but we would point out that this is by no means necessary as regards papers either containing observations on the subjects to be discussed, or on other subjects, which may be sent to us to be read at the meeting.

We are, dear Sir, Your obedient Servants, BRIAN MELLAND, Hon. Sec., Ashley Road, Bowdon. C. W. DANIELS, Hon. Sec., Seamen's Hospital, Albert Dock, London, E.

March 25th, 1902.

Extract from Regulations for the conduct of Annual Meetings of the British Medical Association.

(1) Papers at the Sectional Meetings must not occupy more than fifteen minutes in reading, and no subsequent speech must exceed ten minutes.

(2) Authors are requested to send short abstracts of their papers not later than Saturday, June 28th.

### Dr. P. T. MANSON'S FUNERAL IN HONG KONG.

On the evening of May 5th, the remains of Dr. Patrick Thurburn Manson, eldest son of Dr. Patrick Manson, C.M.G., Medical Adviser to the Colonial Office, were laid to rest in the Happy Valley Cemetery in the same grave in which was buried a younger son of Dr. Manson, who died here in 1887.

The immediate mourners were Sir Francis Lovell, C.M.G., and Professor Simpson, representing the Tropical School of Medicine, Drs. Hartigan and Rennie, partners of the firm to which Dr. Manson formerly belonged, and Drs. Atkinson and Laing, both of whom were personally acquainted with the deceased. The Rev. T. W. Pearce read the service, the first part being held in the mortuary chapel. The body was borne to the grave from the chapel by eight of the members of the European Police Force.

Amongst those present were: Sir Thomas Jackson, His Honour A. G. Wise, Hon. T. H. Whitehead, Mr. F. A. Hazeland, Drs. Harston, Clark, and Gibson, Messrs. T. E. Cocker, H. N. Mody, B. Layton, W. H. Ray, J. H. Cox, D. R. Law, H. W. Robertson, G. A. Caldwell, F. Maitland (Messrs. Linstead and Davis), and many other old residents.

Wreaths and crosses were sent by the following: Major-General Sir Wm. Gascoigne, K.C.M.G., Mr. and Mrs. Wise, Mr. T. E. Cocker, Dr. and Mrs. Atkinson, Mr. and Mrs. F. Maitland, Dr. Noble, Mr. and Mrs. A. G. Gordon, Madame Rieco, Mr. and Mrs. G. Geiger, Mr. H. N. Mody, Mr. and Mrs. Layton, Dr. and Mrs. Hartigan, Dr. and Mrs. Laing, Dr. L. P. Marques, Mr. and Mrs. Bell-Irving, Dr. and Mrs. Stedman, and Mr. Morehead. There were also a number of wreaths which had no card attached.—From Hong Kong Daily Press.

# AN APOLOGY TO THE "JOURNAL OF HYGIENE."

WE owe an apology to the Journal of Hygiene for inserting in our issues of May 1st and May 15th an article on "Recent Researches Concerning the Etiology, Propagation, and Prevention of Yellow Fever by the United States Army Commission, by Walter Reed, M.D." We were so impressed with the value of the article, that we resolved to insert the article verbatim. We duly acknowledged the source of the article, but we omitted to obtain the permission of the Editors or publishers to insert it. For this omission we humbly and readily apologise. We regret the incident extremely. The Journal of Hygiene stands so pre-eminent amongst medical journals in Great Britain that in any way to injure it would be nothing short of a national offence. We have no other journal in the medical literature of this country that takes the same standing, or that devotes itself solely to recording and dealing with research in its widest meaning. Having these opinions, it is scarcely to be thought of that we copied into the JOURNAL OF TROPICAL MEDICINE any article appearing in the Journal of Hygiene with the idea of inflicting injury. The Journal of Hygiene has been instituted but quite recently, and although its reputation is widespread, we thought it becoming in the interests of the Journal of Hygiene to let its excellent publications be known as widely as possible. It was in this spirit that we endeavoured in our humble way to benefit the Journal of Hygiene, but it appears we were inflicting injury by so doing, and for this we wish to communicate our regrets and apologies.

A CASE of plague was reported on board the P. & O. steamer *Victoria* from Bombay. The man was stated to have thrown himself overboard. No other case occurred. At Plymouth the passengers and crew were inspected, and the names of those landing were taken.

### Bebiew.

MILITARY OPHTHALMOLOGY. A Manual for the Use of Medical Officers of the Home, Indian and Colonial Services. By M. T. Yarr, F.R.C.S.I., Major R.A.M.C. Cassell and Co., Ltd. London, 1902. With diagrams. Pp. 236.

Major Yarr's name is so well known as an authority on Ophthalmology, especially in the departments of tropical affections of the eyes and of all appertaining to military requirements, that we welcome the manual he has produced as emanating from one of our best, if not indeed our best authority on the subjects he has made specially his own. The manual contains not only instructions in vision-testing and estimation of errors in refraction, but also places clearly before us such subjects as malarial eye affections, eye injuries, venereal damage to the eyes, malingering, and a mass of useful information pertinent to the wants of medical men in the public services and to practitioners resident in warm climates.

The text is apportioned in fifteen chapters, of which No. ix., Malarial Affection of the Eye and Quinine Amaurosis, No. x., Tropical Eye Diseases (non-malarial), and No. xi., Trachoma (Military Ophthalmia), will prove specially interesting to tropical practitioners. We have been favoured by Major Yarr with so many valuable articles on these subjects in the Journal of Tropical Medicine, that the readers of the Journal are no doubt acquainted with some of the more important facts brought forward in the manual; nevertheless, to have them collated, amplified and systematised as they now are, will be a keen satisfaction. A most valuable appendix deals with "The Vision Regulations of the English [British?] Army compared with those of other Armies."

The whole manual is written in a style which commends itself by its precision, its thoroughness and its clearness. The chapter on Operations is a model which other writers would do well to copy.

We congratulate Major Yarr on his book, and we expect to see the manual he has written in the hands of every medical man leaving these shores to take up work abroad whether in a civil or military capacity.

PREVENTIVE HYGIENE.—Those interested in the subject of venereal disease and its prevention will find the question dealt with in a pamphlet on "The International Conference held at Brussels," September, 1899, written by an English member of the Conference. A second edition has been recently issued, and may be obtained from Pewtress and Co., 28, Little Queen Street, Lincoln's Inn Fields, London. Price 3d.

	Fo	R DY	SENTER	Y.		
R	Acidi sulphurici d Tinct. opii deodor			•••	•••	3ss.
	Spt. camphoræ Tinct. capsici				āā	<b>3j.</b>
	Spt. chloroformi			·	āā	5ss.
M.	Spt. vini gallici S.—3i, q. 2—3 h.—	The	Medical	Tim	es.	Zjss.

### Rews and Motes.

SORCERY, MEDICINE, AND SURGERY IN ANCIENT MEXICO. By ZELIA NUTTALL.

In the Johns Hopkins Hospital Bulletin for April, 1902, Zelia Nuttall gives an interesting account of ancient Mexican medicine men and their supersti-Many of the customs, &c., described are, of course, common to all mankind; nevertheless some interesting descriptions are given by the authoress showing the "curious mixture of ignorance and practical common sense" which attaches to most of the necromantic practices in vogue amongst primitive peoples. Some of the practical hygienic details are especially interesting. In regard to the preservation of the teeth is it recommended: (1) To avoid eating very hot food; (2) not to drink cold water immediately afterwards; (3) clean the teeth after eating with a wooden toothpick; (4) "use cold water and salt for cleaning the teeth, and rub them frequently with a cloth and some finely-ground charcoal."

"The sweat-house" was regarded by the ancient Mexicans as invaluable in many ailments.

Massage for rheumatic pains, sprains, and even a

cough is highly extolled.

Nose bleeding in the year 1576 amounted to a pestilence; it is referred to as being cured by holding a bloodstone, but what the exact nature of the ailment with which nose bleeding was associated is not revealed.

Native herbs and their properties were well known in ancient Mexico, and near Monte Zinna's palace a garden was specially set aside for the cultivation of medicinal herbs.

The authoress has given us most interesting information, and we hope that this is but an introduction to the folk and medical lore of the interesting people who inhabited Mexico in early times.

## Current Miterature.

TREATMENT OF SUMMER DIARRHŒA IN INFANTS BY EXCLUSIVELY WATER DIET.—In the Clinical Journal of July, 1901, Dr. J. D. Windle advocates a "water" diet for young children in the tropics suffering from summer diarrhœa. In his article Dr. Windle expresses himself as follows:-

"The amount of water lost in the stools and by vomiting and perspiration is out of proportion to that taken; in most cases none is absorbed, for vomiting is constant. The excess must come from the blood and tissues. Thirst is the cause of the restlessness and moaning symptoms often wrongly interpreted as due to pain. The great loss of weight, sunken fontanelles, flaccid skin, scanty micturition, dyspnca, and cyanosis, are due to the dryness of the blood and tissues. The vital indication is to supply water, which at once relieves the most urgent symptoms-thirst and vomiting. The blood-vessels of the stomach suck

up the water like a sponge. The emptied vascular system is refilled, blood pressure is raised, and the heart regains its vigour. The child will probably fight shy of the first teaspoonful, fearing probably it is beef-juice or medicine, but the greed with which the next and all water given up to a half pint is taken, the satisfaction, the calm, and the sleep which

ensues, show how badly water is needed.

"Food and 'stimulants' are harmful; if they are retained, attempts at digestion and absorption take place. Water, which should be boiled, supplies all that is essential. The mucous membrane rests and recuperates, so that after twelve to twenty-four hours it is fit to resume light work. Moreover, in addition to relieving urgent symptoms, the water is directly curative; it dissolves the absorbed toxines, the kidneys again become active and eliminate them. The intestinal bacteria die from inanition; their pabulum is cut When the urgent symptoms have ceased—as they almost invariably will do in twelve to twentyfour hours-milk may be given in very dilute form; water must yet constitute the chief aliment. For the first day one part of milk to twenty of water is given. From day to day the amount of milk is increased until the normal proportion is reached. The exclusively water diet may be continued with safety up to forty-eight hours, but only very rarely is it required after twenty-four hours, when diarrhea and vomiting have ceased. Tepid sponging if there is fever, hot, dry packs if there is collapse, and large linseed meal poultices to cover the abdomen if there is pain, are valuable auxiliaries.

"In addition to the above I would like to suggest the advantages to be derived from washing out the stomach through a tube passed through the nose, and from the use of large water enemata. These allow absorption and at the same time remove the toxines.'

ULCERS OF THE LEG.—Dr. O. Schulze (Münch Med. Woch., March 19th, 1901), says that of all remedies, new and old, camphor gives the best results in ulcers of the leg. His prescription is as follows :-

R	Camphor tr	it.	 ***	 dr.	SS.
	Zinc oxid.		 ***	 ,,	viiss.
	Adeps ad.	•••	 	 oz.	vi.
Or,	Camphor trit.		 	 oz.	ss.
	Zinc oxid.		 	 ,,	iii.
	Olei olivæ		 	 ,,	iii.

### PRESCRIPTIONS.

TOOTHACHE.—Place in the painful cavity a plug of cotton wool soaked in

Ŗ	Codeine	***	 	 d gr.
	Oil of cloves		 	 3ss.
	Chloroform		 	 3iss.

### VOMITING OF PREGNANCY:-

	Menthol					2 part	s.
M.S7	Ol. oliv. opt Ten drops in	sugar	when	nausea	occur	10 ,, s.—The	Medical
Times.						7	

### PLAGUE.

### PREVALENCE OF THE DISEASE.

India.—During the two weeks ending May 10th and May 18th the number of deaths from plague in India numbered 11,612 and 7,008 respectively. During the two weeks in question the deaths from plague in the principal centres of the disease were as follows: Bombay City, 391 and 300; Bombay districts, 583 and 429; Calcutta, 280 and 209; Bengal 337 and 136; United Provinces, 401 and 266; the Punjab, 9,192 and 5,453.

EGYPT.—During the two weeks ending May 18th and 25th the numbers of fresh cases of plague reported in Egypt were 33 and 26; the deaths during the same period amounted to 28 and 16 respectively. The towns and districts in which plague occurred were Alexandria, Mit-Ghamr, Mit-Samanoud, Dechneh, Tala, Maghagha, Toukh, Samalouh, Menouf, Beni-Mazar, Damietta, Achmoun and Damanhour. In none of these places, however, has plague obtained a serious hold.

Hone Kong.—During the weeks ending May 27th and June 3rd the number of fresh cases of plague in Hong Kong amounted to 33 and 52, and the deaths from the disease to 33 and 50 respectively.

CAPE OF GOOD HOPE.—During the week ending May 10th two fresh cases of plague occurred at Port Elizabeth and three deaths from the disease.

A PHENOMENON OBSERVED ON THE TONGUE IN ACUTE MALARIAL INFECTION. Dr. Lucien Lofton, in the New York Medical Journal of April 12th, 1902, states:-The condition of the tongue that I wish to bring out in connection with acute malarial poisoning is nearly always present, more or less, and may be said to be pathognomonic of the disease. This condition presents, upon exhibition of the tongue, one or more (generally two) dark lines running from the base of the organ to the apex, and usually separated by a clearly-defined tract of clean mucous membrane about one-sixteenth to one-eighth of an inch wide. These lines are pyramidal in appearance, and begin among the large papillæ at the base of the tongue. They vary in width, and may be from one-eighth to onequarter of an inch wide, gradually coming to a point in the middle of the tongue. In colour they resemble the stain of a 10 per cent. solution of potassium permanganate that has been exposed to air for some time. This condition will most likely be found from one day to two weeks after exposure or inoculation. It remains in some individuals longer than in others, notably in the negro. It is more beautifully defined from six to twelve hours after the initial sporulation, and remains until the system is thoroughly cinchonised. Purgation alone, so far, has failed to relieve the condition, for the gamut of drugs has been run in this connection time and again. Only one line will be found more often in the coloured man than in the white.

### EXCHANGES.

Annali di Medicina Navale. Archiv für Schiffs u. Tropen Hygiene. Archives de Medicine Navale. Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie. Australasian Medical Gazette. Boletin de Medicina Naval. Boston Medical and Surgical Journal. Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology. British Medical Journal. Brooklyn Medical Journal. Caducée. Climate. Clinical Journal. Clinical Review. Giornale Medico del R. Esercito. Hong Kong Telegraph. Il Policlinico. Indian Engineering. Indian Medical Gazette. Indian Medical Record. Janus. Journal of Balneology and Climatology. Journal of Laryngology and Otology. Journal of the American Medical Association. La Grèce Médicale. Liverpool Medico-Chirurgical Journal Medical Brief. Medical Missionary Journal. Medical Record. Medical Review. Merck's Archives. New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyclinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo. Sei-i-Kwai Medical Journal. The Hospital.

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### Motices to Correspondents.

1.—Manuscripts sent in cannot be returned.

2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the Journal of Tropical Medicine should communicate with the Editors.

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

# The Journal of Tropical Medicine.

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In order to meet the constant enquiry for addresses of respectable firms catering for the various requirements so difficult to obtain abroad, we give a list of names and addresses which we trust will be found useful to our numerous correspondents and subscribers.

### Original Communications.

EPIDEMIC DYSENTERY IN GRENADA DUR-ING THE LATTER MONTHS OF THE YEAR 1901. A CONSIDERATION OF ITS CAUSE, SYMPTOMS, AND TREATMENT.<sup>1</sup>

By A. B. DUPREY, M.R.C.S., L.R.C.P.

Colonial Assistant Surgeon, St. Lucia; late District Medical Officer, Grenada.

In as much as I have been asked to give a report of this present epidemic of dysentery now raging through all the districts of the Island of Grenada, I shall endeavour, to the best of my ability, to give in as precise a manner as possible my impressions, and the observations which force themselves upon me, and the course of action and treatment I adopted during my rounds of practice among the people. In a district of such a size and population, being at least twelve miles by six, and possessing not less than ten thousand people, it is well nigh impossible for any one man to do more than give his attention to each patient in succession, and to point out to the attendants the proper course and advice to be followed for the successful management of each individual case; for it may happen that the medical attendant will not have an opportunity of paying a second visit to any one case.

Dysentery is at all times a difficult disease to manage, and one which requires, even in hospital practice, all the care and attention of both medical man and nurse. What must it be, therefore, appearing as it has done for the last three or four months in epidemic form, and in such a district where some of the places are almost inaccessible? Any attempt at a scientic investigation by an officer during

The primitiveness and nonchalance of the peasantry in matters of sanitation is simply outrageous, and is hardly conceivable in these days, where the peoples of other nations are striving their utmost to arrive at, as near as possible, a state of perfection in matters appertaining to preventive medicine. The obstinacy of ignorance, even in some of the more educated classes, has, unfortunately, been the cause of many a fatal case, who otherwise might have recovered from this fearful malady; and not a few cases have succumbed to the more regrettable practices of some persons who pose as experts for this "belly complaint," which the easily gulled are told cannot be treated or even understood by the doctors.

### CAUSATION.

The world of science has long ago recognised epidemic dysentery to be a water-borne disease, so one naturally turns to eliminate the first and most probable factor in the causation of the disease. This factor once made manifest, prevention easily follows. I personally have no doubt whatever that, were the water to be examined chemically and bacteriologically, the source of all this trouble would be found therein: a glass of water as obtained from the pipes of the town of Gouyare, if examined critically, even with the naked eye, cannot but suggest to the mind grave possibilities of infection. It is very turbid and rich in solids, has a sickly nauseous smell, even sometimes putrid, and decidedly heavy to the taste. It leaves a deposit on standing, and were it to be submitted to evaporation in the usual way would, I dare say, leave

the hurry of practice at such a time is, of course, out of the question, as can be well understood by any person who is thoroughly acquainted with the district; an honest and accurate study of each case as it presents itself is the only possible course, for as regards any elaborate clinical details, which can only be got by watching cases through their whole course of illness, one can hope to do so only in a very few instances.

A paper prepared for the Government of Grenada, and published with the permission of the Colonial Surgeon.

an abundant residue, no doubt of the nature of a poisonous vegetable alkaloid. Knowing, therefore, that all epidemics of dysentery have been traced to an impure water supply, I have adopted the course of recommending to the inmates of each house visited the precaution of boiling their water and, if possible, filtering it also. This recommendation was, I am glad to say, promptly adopted in the parish of St. Marks, where the epidemic lasted but for a short It was short and sharp, forty-three cases receiving medical aid in the course of a few weeks. In the parish of St. John's, however, the cause of the epidemic was generally believed to be in the air, which belief obtained not only among the lower classes, who were practically the only sufferers, but even among some of the better educated, who, although dogmatic on the point, yet took the precaution necessary to safeguard themselves against infection by boiling and filtering their water, or by the exclusive use of pure rain-water for drinking purposes. This obstinacy could not therefore have but one result, and that was disaster, for when the parish of St. Mark's was absolutely free of dysentery, St. John's, and especially the town of Gouyare still suffered, and likewise those other parishes whose people did not adopt the only preventive possible in such an emergency. The water supply of the town of Gouyare is obtained from a reservoir, which is unworthy of the name according to the modern principles of storage of water for the public use.

The year 1901, I am told, has been an unusual one in the records of Grenada as regards its rainfalls, and the rivers have been almost continually flooded. Fruit has been so abundant that it dropped and lay rotting in the river bed. The reservoir is unprotected, either by filtrage or otherwise, and is merely a receptacle through which the river runs, the water being distributed in its original state. I am fairly justified, therefore, in believing that the cause of this epidemic, occurring as it does only among a certain class of the population who use exclusively the reservoir water, and who are not liberally fed, is not far to seek.

### SYMPTOMS.

The attacks of dysentery are very much less, both in number and severity, than was the case three months ago. The symptoms are much milder, and unless it occurs in a person advanced in age, or otherwise handicapped by previous diseases, the prognosis is always favourable. Recovery is now the usual result, providing the case has been seen and treated early; and, even without systematic medical treatment, many recover.

The disease usually commenced with griping abdominal pains of a very severe nature, persistent retching and vomiting, which often were uncontrollable, and the passing of frequent small stools, consisting of glairy mucus and blood, with much straining and tenesmus. Often the motions consisted of almost pure, frothy blood, though not in any large amount, in fact, never any more than about a teaspoonful at a time. The patient was frequently doubled up with pain and straining; cold, clammy perspiration would sometimes pour from him through the incessant and ineffectual attempts at defæcation. His face would be pinched, with a settled, anxious expression on it,

which, on the hope of speedy help, would show a sudden and brief relief. This relief, however, which I have often observed, is only momentary, and soon there was a return of all the symptoms, with apparently greater force; his hands would be cold and damp, his pulse small and frequent, running up from 120 to 140 beats in the minute, the temperature either normal or subnormal, the mouth dry, the tongue thickly furred, and the patient would call constantly for water, which he swallows down with an avidity painful to see, his hand trembling as the glass is carried with much hesitation to his mouth, so that he has to be helped in the effort. He then falls back in bed in a state of utter exhaustion and collapse. Such a picture of distress was fairly common in the early days of the epidemic, and it is no exaggeration to say that the sufferings of the victims were even far greater than I have attempted to paint them. symptoms were those of a violent gastro-intestinal irritant, which I have no doubt it was. After a very short time, indeed, seventy-two hours at the most, the motions would change to frequent, dirty, offensive, reddish-brown stools, and soon to the beef-washings of gangrenous dysentery: finally exhaustion and death. Symptoms of a very urgent and far graver nature, however, were observed in a few cases, which, to my mind, strengthened the view I have adopted regarding the causation of the epidemic. Those were of an extremely violent gastro-intestinal nature, and not unlike the symptoms that are produced by alkaloid ptomaines, usually known as ptomaine poisoning. The patient would be taken quite suddenly with retching and uncontrollable vomiting and diarrhœa, the surface of the body would be cold and perspiring, he would complain of great thirst and dryness of the throat; the pulse small, weak and running, could hardly be counted; the respiration rapid and shallow, and before the objective symptoms of dysentery would develop themselves death would take place from exhaustion and general collapse. Symptoms thus varied considerably from the very slightest attack to the most distressing condition detailed above, thereby affording ample grounds for the belief that a subtle poison is the agent and principal factor, and that the symptoms varied according to the dose.

It will be noticed that I have not mentioned pyrexia among the urgent symptoms observed during the epidemic, for the very good reason that fever was never a usual accompaniment in an attack of dysentery. The temperature was generally normal, or even subnormal. In only twelve cases, or a percentage of 4.6, did the pyrexia required to be treated and quinine administered. The fever usually was of an intermittent type and bearing all the appearances of a malarial origin, quite distinct from the dysenteric condition, so that it seems the lowered vitality of the patient, which must of necessity follow on an attack of dysentery, brought out the attack of malaria, hitherto quiescent in the subject. Some were "fever subjects," and naturally required to be treated for such. In one case temperature remained obstinately high, registering at one time 105° F., notwithstanding quinine and baths. In this case nothing could be retained either in the stomach or rectum; uncontrollable retching and vomiting defied both hypodermic injections of morphia or hot applications to the epigastrium; the dysentery became rapidly gangrenous, shreds of mucous membrane were frequently cast out from the rectum, and death took place seventy-two hours after the first onset of symptoms. Pyrexia was more often observed in children, though never to any serious extent. Temperatures of 101° or 102° F. were treated by baths and spongings, or more or less disregarded, while attention was directed to the more urgent abdominal symptoms. I cannot, therefore, say that pyrexia has been a very marked symptom during this epidemic of dysentery.

marked symptom during this epidemic of dysentery. SEQUELE. Under this head will be considered briefly some of the most important and immediate sequelæ following upon an attack of acute dysentery. As far as I know, the after and immediate effects of this disease upon a person who has passed through a sharp attack have not been sufficiently studied. Such sequelæ as contractions of cicatrices resulting in obstruction are but rare events, and liver abscesses may occur a long time after the attack, when possibly they may be due to other agents besides the poisons of dysentery. There are more important results requiring far more consideration, as upon their careful and accurate recognition depend the safety of the patients. Like diphtheria, the sequelæ may prove far more dangerous than the disease, and especially in dysentery the patient may be carried off from cardiac failure through a paralysis of its muscular walls, although the dysenteric process may seem to be on the mend. In three cases acute œsophagitis was a marked symptom and gave considerable trouble, while associated with that were usually acute or subacute stomatitis, so that the swallowing of even small quantities of liquid was accompanied with great difficulty and pain. In one case this was a serious complication and nearly caused the death of the patient. Bright's disease was a frequent sequela; in six cases the bloated face, cedema of the legs and albuminuria were very marked; in one case the condition was not treated for three months, and was so apparently advanced as to seem hopeless, yet he rallied after a month or two of treatment in such a marked manner that the change was surprising. It was more common in children showing clearly a lesser resisting power to the dysenteric poison in the course of excretion through the kidneys, but even in them the inflammation was transient and passed off after careful treatment. One must see, however, the extreme danger of a chronic inflammation of the kidneys persisting in a person whose vitality has been considerably depressed by a long attack of dysentery. Peripheral neuritis is another condition observed in those who suffered severely from dysentery. complained of cramps and weakness of the legs, of numbness and tingling. The course of the sciatic nerve was more or lest tender in some and in not a few sensation in the limbs was impaired. This condition was always present in both limbs and not due, as one might suppose, from lying constantly in one position. There were other troublesome conditions observed, such as urticaria and pruritus, which latter kept the patient awake night after night and

thus helped to prolong convalescence.

TREATMENT.

I now come to consider the question of treatment, which is by no means an easy matter, considering both the nature of the country and a people whose prejudice against qualified opinion and legitimate medicine is somewhat extraordinary to a logical mind. On the other hand, any "bush medicines" or other nostrums recommended by friends are taken up with great promptitude and persevered in with a doggedness born of the greatest fortitude. Thus Chamberlain's diarrhœa mixture rapidly disappeared from the druggists' shops, and the stock in the whole island was, I believe, speedily exhausted. Then recourse was had to the bark of the sea-grape and the cashew, which were boiled together, including other bush remedies, to form a tisane, the nature of which was highly astringent. This mixture was kept "in the pot" boiling all day and drank in teacupful doses This crude remedy, as it appears, was the ad lib. very worst that could have been chosen, for with the exception of opium and morphia, all astringents were distinctly contraindicated in the early stages of an acute attack, inasmuch as they caked up and bound the bowels, thereby increasing to a great extent the

absorption of the dysenteric poison.

There were in all 260 cases of dysentery treated between August 7th and December 29th, 1901, of which number 224 are recorded as giving positive results one way or the other, the remaining 36 being The number of doubtful as to their termination. cases treated with sulphur and Dover's powder were 193, and the method adopted was upon the lines recommended by Dr. G. E. Richmond (Lancet, June 15th, 1901), with a mortality of 8.4 per cent. This is not the first time I have used sulphur in the treatment of dysentery, having experimented with it at the Colonial Hospital, Port of Spain, Trinidad, more than four years ago; but the over-crowding state of the diarrhea ward at that time was such that it was impossible to derive any good results from the Thus it will be observed that sulphur in the treatment of dysentery has afforded ample satisfaction, notwithstanding the disadvantages of practice in such a district. In most cases the patients, owing to long distances, were seen twice, and a large number but once only. The immediate result of taking 20 grs. of sublim. sulph. combined with 5 to 10 grs. of pulv. ipecac. co. every four hours, was in all cases a stoppage of the blood and mucus after taking half a dozen powders. The straining was much lessened and the motions were less frequent and more fluid. The griping pains, however, continued just as severe, and it was remarkable that in women the most severe pain was situated over the hypogastrium, so that they believed that their wombs were affected and my diagnosis completely wrong. These severe griping pains, I concluded, were due to irregular peristalsis of the inflamed bowels, which subsided at once on giving morphia. The resulting diarrhœa could always be checked by the administration of bismuth and opium. Most of the patients as a rule took the sulphur very well, and themselves noticed the immediate good effect of the treatment; a few complained of severe retching, but as this was one of the most marked symptoms of the epidemic, the sulphur could not be put down as being the cause. In conjunction with the powders, and in all cases where retching was severe, I recommended frequent sips of very cold water, and sometimes applied a mustard poultice on the epigastrium. The treatment of dysentery by sulphur, whether in an acute or chronic stage, deserves, therefore, the highest recommendation; especially is this the case in district practice. The difficulties of making people keep to a prescribed diet are, of course, obvious. I have known one patient who had a severe attack and recovered, although he fancied nothing else but plain boiled salt beef and potatoes, which the wife

said he ate heartily.

Ipecacuanha gave less good results on account of the distress into which the patients were thrown owing to constant retching and vomiting; 20 to 30 grs., always preceded by a draught of opium or a hypodermic injection of morphia, was the mode of administration. In some cases the depression produced by ipecacuanha were so great that the patients refused to take it, saying that it aggravated their condition, but in six instances where opportunities were afforded of watching those cases ipecacuanha gave excellent results. Usually in adults 1 gr. of morphia was injected either in the arm or epigastrium, and the powder was given just about the time that the patient feels he is going off to sleep; given in this way the powder is retained, and any subsequent dose does not generally require a repetition of any morphia. In children the following formula was found to be very useful, viz., hyd. cum cret. gr. i., pulv. ipecac. co. gr. ii., bism. subnit. gr. iii., sulph. sublim. ad. gr. xii., every six hours, or as thought fit by the medical attendant.

The saline treatment of dysentery was tried in several instances where the cases were seen very early, and where opportunities were got of revisiting the patients; but in districts where time and distance must be taken into consideration, the sulphur mode of treating epidemic dysentery is, I am convinced, the best means we possess at present.

THREE LECTURES ON BILHARZIA,

Delivered at Kasr-el-Ainy Hospital, Cairo.

By Frank Milton, M.R.C.S.

Surgeon to the Hospital.

Lecture II.—(Continued from p. 192).

URINARY CALCULI.

STONE, although a fairly common complication in this stage of bilharzia, occurs more frequently and is altogether of more importance in the earliest stages of the disease. When stone is present in the later stages it is, as a rule, composed of phosphates, and very soft, and its presence is hardly noticed where the symptoms are already so severe. It very often happens that patches of roughened mucous membrane encrusted with phosphatic deposit give rise to more severe symptoms than true calculi themselves, and it takes some little practice and care to diagnose this condition from true calculus. Calculi which occur in the earlier stages of the disease are of much greater importance, as they then give rise to their characteristic

symptoms, and are capable of making their presence felt. There is no doubt that the majority of these stones owe their origin directly to the bilharzia, for in practically all the cases of stone we get at the hospital, amounting on an average to about 150 a year, bilharzia eggs are either still present in the urine, or there is a history of bilharzial disease within the period of time necessary for the formation of the calculus. The majority of the stones, too, are formed in the bladder itself, and have not descended from the kidney, being due to the deposition of its salts by the urine during its stay in the bladder under the influence of the diseased mucous membrane, and are not due to imperfect elimination by the kidneys; besides it has sometimes occured that small clots and collections of bilharzia eggs have been found forming the nucleus of the stone. The symptoms caused by these calculi are overshadowed and masked by the symptoms due directly to the bilbarzia; but the presence of the stone greatly increases the patient's sufferings; indeed, the relief experienced by the patients after lithotrity is so great that as a rule they look upon themselves as cured, and decline to waste time over the treatment of their bilharzia.

When the disease is well advanced in the bladder, it would only be natural that neighbouring parts, such as the prostate gland and the seminal vesicles, should became implicated and give rise to symptoms; great stress is laid by some writers on the sufferings of patients due to affection of these parts, and they attribute irritation of the bladder, vesical tenesmus, and dysuria to their implication; but I doubt if, whilst the disease is in a sufficiently early stage to permit, as it were, a sifting out of symptoms and their attribution to the precise structure on whose implication they depend, the prostrate or seminal vesicles will ever be found very particularly involved; and when the disease is of sufficiently long standing to have caused secondary changes in or a continuous extension to these parts, I doubt if the symptoms to which such extension would give rise would be of sufficient severity to make themselves felt as distinct from the true bladder symptoms. The abnormal ejaculations and spermatorrhœa also spoken of by these writers, I have never heard complained of, although they are symptoms which native patients would be quick to notice and to attach importance to. When death occurs as the result of bilharzial disease of the bladder, it is brought about either by exhaustion from pain and want of rest, together with debility consequent on the constant hæmorrhage, aided by poisoning from the absorption of septic matter from the bladder; or it occurs as a consequence of extension of disease backwards to the kidneys, setting up pyonephrosis, pyæmia, or uræmia. Sufferers from bilharzia are very often the victims of other parasitic diseases, such as ankylostomiasis, which also contribute towards a fatal ending; but the bilharzia itself is quite equal, without extraneous aid, to the task of destroying its victims, which it does in a large number of cases, and with unspeakable torture.

URINARY FISTULE.

The symptoms due to the formation of urinary fistulæ will differ accordingly as to whether the fistula



originates in the roof or the floor of the urethra. In the case of fistulæ arising from the roof the symptoms are comparatively mild and unimportant, and in our hospital practice patients are seldom or never seen in the stage of formation of fistulæ the discomfort not being great enough to cause them to leave their work to seek relief. In the majority of cases it is probable that the symptoms in the early stages of the malady are so comparatively slight that they pass unregarded in the presence of the more severe suffering entailed by the disease existing in other parts of the urinary system; for I doubt if the urethra is ever attacked with bilharzia without the bladder being first implicated.

It is quite easy to understand, then, that in the presence of the irritation due to the passage of unhealthy urine along the urethra, the pain likely to be caused by a slowly forming ulcer or sinus would pass unnoticed, and this is probably nearly always the When, however, the process of disintegration approaches the skin surface, the disease begins to make its presence more acutely felt, for the vitality and resistance of the skin is so great that it cannot be destroyed until the accumulated products of destruction due to the progress of the disease have set up sufficient inflammation to cause the formation of a subcutaneous abscess, and it is a result of this suppuration that the skin is finally perforated and the fistula completed. The first symptom, then, which arrests the patients' attention in cases of roof fistulæ, is the formation of a subcutaneous abscess, generally in the perineum, which, after existing for a variable time, opens and discharges a small amount of unhealthy pus, which, if it were examined microscopically would be found to contain numerous bilharzia eggs. The abscess after it has opened and discharged its contents shows no inclination to heal, and the patient then notices that after micturition the amount of discharge is increased, and finally he discovers that the discharge from the sinus consists of pus, mixed to a greater or less extent with urine.

The symptoms due to fistulæ originating in the floor of the urethra are very much more severe than this. In the first place, as soon as the invaded mucous membrane has broken down and formed an ulcer, or rather, perhaps, as soon as this ulcer has begun to extend into the underlying tissue, the urine and the debris from the bladder becomes entrapped, as has been explained earlier, and forms a peri-urethral abscess, which is continually discharging its contents into the urethra. The actual pain in the abscess itself is not very great, but the inflammation set up in the delicate mucous membrane of the urethra by the irritating discharge is very great indeed, and the pain is increased by the passage of the urine over the inflamed tissue. Besides the pain and scalding due to the urethritis, there is always difficulty in micturating, for in the early stages the urethra is narrowed by spasm due to the pain, and later on true stricture is developed by the formation of inflammatory tissue in the whole length of the urethra on the distal side of the fistula. This stricture, if the inflammation is kept up for a length of time, may narrow the urethra down to a point where the finest instruments are unable to be passed along it, and the

urine can escape only in drops, the greater part passing through the fistula, and in a certain proportion of cases the urethral canal becomes obliterated altogether, and is merely represented by a solid cord of fibrous tissue. These strictures when once they are fairly established are extremely resistant to treatment by dilatation, for their extent is very great, and the new tissue is so dense and tough that it will not yield to any justifiable amount of force, and even if it can be made to stretch over the catheter, it will invariably return to its former condition on the instrument being withdrawn.

As I have already said, it is very rare for a man to come for treatment of a roof fistula before it has reached the stage at least of subcutaneous abscess, but with floor fistulæ it is very different, the majority of patients seeking relief even before the sinus has approached the skin surface, owing to their difficulty in passing water, and to the severe pain and scalding

due to the presence of urethritis.

The signs of the two forms of fistulæ are as distinctly characteristic as their symptoms: Thus, in roof fistulæ the openings of one or more sinuses are found usually in the perineum or posterior aspect of the scrotum, or it may be in the anterior aspect of the scrotum, or on the pubes or thighs, but they are almost invariably away from the direct line of the urethra wherever they may be situated. The openings are small, with protruding granulations at their mouths, and the skin around is somewhat scarred and drawn in towards the opening as to a central point, and on manipulation a certain amount of thickening and matting together of the underlying structures can be felt, which is not very well defined and becomes more indefinite the deeper it is traced. In the floor fistulæ the signs are much more prominent. The openings, although generally in the perineum, are frequently in the penis anterior to the scrotum, and they are always in the immediate line of the urethra. The openings themselves resemble those of the roof fistulæ, but the skin is, as a rule, much more extensively adherent and thickened, and leading from the skin surface directly down to the urethra and clearly connected with it, will be found a sharply-defined mass of stony hardness and varying extent. The meatus urinarius will generally be found much narrowed and scarred, and probably thin, unhealthy pus will be found oozing from it, and on introducing a catheter a well-marked stricture will almost certainly be found. None of these latter signs are seen in roof fistulæ even of long standing, whereas they are almost constantly present in floor fistulæ, and the stony tumour connected with the urethra, with narrowing and discharge from the meatus, will be found even before the fistula has reached the surface and become complete.

### BILHARZIA IN THE INTESTINE.

Bilharzia of the intestine, which, for our purpose, may be confined to bilharzia of the rectum, follows much the same course as bilharzia of the bladder, with its symptoms, of course, modified by the structure and functions of the part invaded. The earliest symptom of rectal bilharzia would appear to be not hæmorrhage, as in the case of the bladder, which

is there caused by rupture of superficial vessels by the mechanical force of the contracting viscus, but over-secretion of mucus from excess of function of the irritated glands in the hypertrophying mucous membrane, together with irritation in the part due to the presence of the numerous eggs. This excessive secretion of mucus and irritation give rise to sensations resembling those caused by the presence of fæces in the rectum, pressing down on to the sphincter, and causes a feeling of the desire to evacuate the bowel in the patient, who, in consequence, is constantly trying to obtain relief by attempts at defæcation; these repeated efforts end, as a rule, in nothing but the passage of small quantities of fæcal matter enveloped in mucus, and this only after a great deal of straining and forced effort. cause of the uneasiness not having been removed the patient experiences but little relief from his small evacuation, and is induced after an interval to try again to obtain a more satisfactory result. The constant efforts at evacuation, accompanied as they are with much straining, tend, after a time, to increase the already abnormal state of hyperæmia and irritability of the rectal mucous membrane, and it tends at the same time to cause relaxation of the sphincters and to induce a state of prolapse.

As the disease advances and the bilharzial infarction extends the mucous membrane becomes more hypertrophied and its secretion increased, and the superficial vessels become engorged and liable to rupture. The desire to empty the intestine, and its accompanying tenesmus, becomes more frequent and urgent, and the patient redoubles his efforts, with the result that he is now constantly called to stool and passes varying amounts of blood and mucus, mixed with small quantities of fæcal matter, and, of course, including numbers of bilharzia eggs. This constitutes the so-called bilharzial dysentery. When the disease has reached this stage the mucous membrane will be found to have undergone permanent alteration in the way of overgrowth, hyperæmia, and probably the formation of polypoid adenomata. The frequent and continous effects at expulsion increased by the development of these growths, and lasting for long periods, will at last cause the heavy, thickened mucous membrane to be itself protruded from the anus and the stage of prolapse is reached, which in its turn may progress, until the greater part of the rectum is constantly outside the anus. The prolapsed bowel can, at any rate at first, be easily returned by its own retraction; but after a time, as more bowel protrudes, the patient will find that he has to employ his hands to force the prolapsed part back; and eventually, if he survives long enough, either the gut will become so thickened that all his efforts at reduction will be unavailing, or else the sphincters will become gradually paralysed from overstretching, and although the prolapse can be made to return it cannot be retained, and it will remain permanently outside the body and liable to injury and

The state of a patient with bad rectal bilharzia in its later stages is almost as miserable as that of one in the last stages of bilharzia of the bladder, and death is brought about in much the same way by want of

rest and exhaustion, due to the constant efforts at defecation and the never-ending discharge of mucus and blood.

Of course the whole progress of the disease is essentially chronic in its nature, and the patient may suffer for months and even years from the "dysenteric" symptoms before even prolapse occurs; and again, he may endure the sufferings incidental to this stage of the disease for an equally long period of time before death relieves him of his misery.

### BILHARZIA IN THE VAGINA.

The symptoms due to bilharzial affection of the vagina are, on the whole, those of subacute vaginitis, but as the cases that I have seen have been so few in number, and have been so modified by treatment before coming to me, I feel I must wait for further experience and the examination of more unmodified cases before I can venture to tell you much about the disease in this locality. The only typical thing that I have so far recognised as likely to help you in your diagnosis is the very great thickening of the mucous membrane, especially on the posterior wall, and the peculiar and well-marked crossing fissures on its surface.

### DIAGNOSIS OF BILHARZIA.

The consideration of the diagnosis of bilharzia need not detain us very long, for this depends essentially on the discovery of bilharzia eggs in the excretions of the diseased part or in the tissues of the part itself. In bilharzia in the bladder, the hæmaturia, with its peculiar nature and time of occurence, namely, in the last few drops of urine passed, cannot be mis-taken for that due to any other disease; the only difficulty likely to arise in these cases is to decide whether the patient has a stone in his bladder as well as a deposit of eggs, and this is at once determined on the passage of a sound. The determination in the later stages of the disease as to whether malignant growth has been grafted on to the bilharzial growth in the bladder is not, I think, of very great importance, and can only be determined with any degree of certainty by a digital examination of the bladder, except, perhaps, in those cases where the malignant growth is so extensive that it has overstepped the limits of the bladder and has involved the surrounding structures, when the nature of the case will at once be evident. As regards the rectum, the diagnosis is also, as a rule, quite simple, for although the earlier symptoms to some extent resemble those of chronic dysentery, still there are marked differences in bilharzia. The onset is invariably insidious, beginning simply with a sense of discomfort in the rectum, gradually increasing, and with the occurence in process of time of frequency of defæcation, with straining and passing of mucus and some hæmorrhage, but this only developes very gradually, and never has an acute onset, as is usual with true dysentery. Again, there is never any general gastro-intestinal disturbance, such as expresses itself in true dysentery by the condition of the tongue, the severe abdominal pain, and fever; nor, as a rule, are the stools particularly offensive, and they do not contain visible sloughs; and where the disease is well established all doubt

in the diagnosis will be set at rest by the introduction of the finger into the rectum, and the discovery of the typical polypoid tumours. The urethral fistula, as a rule, give rise to no difficulty in diagnosis, for in this country, at any rate, it is extremely rare to find any other form of urinary fistulæ except those due to bilharzia, and a history can always be obtained from these patients of preceding bilbarzia of the bladder. There is one form of bilharzia disease which may be wrongly diagnosed, and that is commencing fistula arising from the floor of the urethra, and before it has opened externally, that is to say, whilst it is still in reality in the stage of peri-urethral abscess. This particular form of the disease I have over and over again seen diagnosed, and indeed in early lays have myself diagnosed, as stone in the urethra, and until the true nature of the case has been demonstrated by operation, it is very hard to believe that the diagnosis is wrong; for the extreme hardness of the walls of the abscess, which can be picked up between the finger, and can be felt to be intimately connected with the urethra, gives exactly the sensation of a stone obstructing and partly extruded from the urethra. When, moreover, the patient himself comes for difficulty in micturition, with pain and sense of stoppage at the site of this tumour, the diagnosis seems complete and the case comes to be regarded as one of long-standing, incomplete obstruction of urethra, due to the impaction of a calculus such as is so common among our out-patients. There are, however, two, or probably three, almost infallible signs which will put you on the right track, the first is the continuous escape of the unhealthy pus from the meatus, of which, by the bye, the patient seldom takes any notice; the scarred, glazed and narrowed look of the meatus itself; and the hard indurated feel of the urethra from the situation of the tumour right up to the meatus. Very often, too, it is impossible by squeezing the tumour firmly between your finger and thumb to cause an increased flow of pus along the urethra, and if then, to confirm your opinion, you pass a sound carefully down the urethra, your diagnosis will be completed.

I do not quite know how you would at first sight diagnose bilharzia of the vagina, but if you come across any obstinate cases of long-standing, subacute vaginitis with much thickening, and possibly fissuring, of the mucous membrane, I should advise you strongly to snip off a small piece of the membrane with a pair of scissors and examine it under the microscope for

bilharzia eggs.

(To be continued).

### CORONATION HONOURS.

K.C.M.G.

Surgeon-General H. Pinching, Head of the Sanitary Department at Cairo.

Ronald Ross, Esq., F.R.S., F.R.C.S.

Ho Kai, Esq., Unofficial Member of the Legislative Council of the Colony of Hong Kong. [Ho Kai is an M.B., C.M.(Aberd.), M.R.C.S.(England).]

We congratulate these gentlemen on their well-deserved honours.

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THE

# Journal of Tropical Medicine

JULY 1, 1902.

THE LONDON SCHOOL OF TROPICAL MEDICINE AND SIR FRANCIS LOVELL IN THE FAR EAST.

On the invitation of Dr. F. W. Clark, Medical Officer of Health for the Colony, a large number of medical men and members of the Press were invited to meet Sir Francis Lovell at dinner in the Hong Kong Hotel, on May 1st. The object of Dr. Clark's generous hospitality was to allow Sir Francis, who is travelling round the world in the interests of the London School of Tropical Medicine, to explain what are the objects of his mission.

In the course of his speech Sir Francis said: "The work that has been achieved in the School, as regards both research and ordinary clinical and bacteriological investigation, has been amply recognised by the profession, and the number of students has steadily increased. The present school buildings are far too small, whether from a tutorial or from a research point of view, there is therefore imperative necessity for their extension. The laboratory and library should be doubled in size. Research laboratories, a lecture theatre, a mosquitorium and a museum are required. The residential accommodation should also be much increased; at present there is only room for six resident students; there should be accommodation for twenty. More travelling scholarships, similar to that generously endowed by Mr. J. C. Craggs, and known as the 'Craggs Research Scholarship,' are wanted.

"With these objects in view the Committee of Management, with the full concurrence of the Rt. Hon. the Secretary of State for the Colonies, resolved to accept my offer to proceed to India and the tropical colonies, especially where diseases peculiar to hot climates prevail, and to bring to the notice of the various Governments, and of influential and wealthy residents and employers of labour, the advantages they will derive from the School, and to endeavour to obtain their support for its extension. I accordingly started on this mission last October, and on my arrival at Bombay had to ascertain how I should proceed in the matter. At first I met with a good deal of discouragement. It was pointed out to me that things generally were in a bad way in that Presidency: plague and famine were prevalent; the cotton industry, almost the mainstay of the commercial world, was declining; many mills had already closed, and many mill-owners were bankrupt; calls for pecuniary help had recently been very frequent for local objects; and a list was then being circulated for subscription to the 'Victoria Memorial.' These were advanced as reasons why it was unlikely I should succeed with my mission in Bombay. However, after consultation with some of the leading members of the medical profession-European, Parsee, Mussulman and Hindoo-we decided to make an effort to obtain help for the School in that city. I commenced by giving an address on the subject of my mission to the members of the profession at the Bombay University, and after some debate, resolutions expressing approval of the scheme and

recommending it to the generous support of the Government and people of India were adopted. A small committee of medical gentlemen was appointed to collect subscriptions, and after a few weeks' stay in Bombay, I was able to remit to the bankers of the School such a sum as was very aptly described by the Committee of Management as constituting the result of my visit there phenomenal. Encouraged by this, my next visit was to Calcutta, where I spent the month of January; but there I did not meet with such support from the members of the Indian Medical Service as I did in Bombay, and on the whole my sojourn in that city was not as satisfactory as one would have expected. I received much sympathy with and encouragement in the object of my mission from some of the leading native medical gentlemen in Calcutta, and with their assistance succeeding in obtaining a few fairly handsome donations, and was able to bring to the notice of the public the advantages all residents in tropical countries are likely to derive from the work that is being carried on in the School. From Calcutta I proceeded to Ceylon, and there, again, I met with the same objections and difficulties that were said to exist in Bombay in successfully prosecuting my mission. I succeeded in obtaining from His Excellency the Governor the promise of an annual grant-in-aid for five years to the school on the condition that six students from Ceylon may be allowed every year to avail themselves of a course of study in the School without paying the usual fees. A Committee was appointed with Dr. Allan Perry, P.C.M.O., as Chairman and local representative of the School, and I am informed that in due course he has good reason to believe that substantial donations to the School will be forthcoming. I then proceeded to the Straits Settlements and Federated Malay States, and am glad to say that my visit there has proved very successful. His Excellency Sir Frank Swettenham, as Governor of the Straits Settlements and High Commissioner of the Federated Malay States, has promised the School an annual grant-in-aid of £200 for five years on conditions similar to those proposed by the Ceylon Government. His Excellency further

decided to place the Directorship of the Kuala Lampur Medical Research Institute in the hands of the Committee of Management of the London School of Tropical Medicine, who will in future select one of its students who has distinguished himself in research work and bestow upon him this post, which practically amounts to a scholarship tenable for three years, with an annual salary of £750, with free furnished quarters. I look upon this as the most important asset that the School has so far obtained. I travelled through the Federated Malay States, and succeeded in getting the support of the residents, from whom I received much valuable help; a committee, consisting of Mr. W. Cowan, Protector of Chinese, as Chairman, Drs. Wright and Edgar, and several leading members of the Chinese community, was appointed to collect subscriptions in the state of Perak, and up to the present very satisfactory results have been obtained. In Penang a similar course was followed, with His Honour Mr. Justice Leach, as Chairman, Mr. Hunter, Treasurer, and Dr. Freer, Colonial Surgeon, Secretary, and the news which I have already received from the latter is most encouraging. In Singapore, two committees have been appointed; one consists of a sub-committee of the Singapore Branch of the British Medical Association, with Dr. Galloway as Chairman; the other comprises four or five leading members of the Chinese community, and has for its Chairman the Hon. Mr. W. Evans, Protector of Chinese. Both these committees are doing all they can to further the objects of my mission and have already met with much success. I have now come to Hong Kong, gentlemen, and I hope that with your co-operation my efforts here to obtain support for the London School of Tropical Medicine will meet with at least as much success as they did in Singapore and its dependencies. I have hitherto found that it is most expedient to try and obtain the advice of my colleagues and others resident in any country that I may visit in regard to the manner in which I should proceed with my mission, rather than initiate my own manner of prosecuting it, and I propose, with your approval, to follow the same course in Hong Kong, and I shall therefore

conclude by asking you, gentlemen, to favour me with your views and advice."

Professor W. J. Simpson, Dr. Atkinson (Principal Civil Medical Officer), Hon. Dr. Ho Kai, Dr. Hartigan, and Dr. Rennie also addressed the meeting, and bore testimony to the good work done by the London School of Tropical Medicine. A small committee to act on behalf of the School, consisting of Drs. Ho Kai, Rennie and Atkinson, was appointed on the motion of Dr. Clark, seconded by Deputy Inspector-General Wright, R.N.

The School authorities in London owe a debt of gratitude to Dr. F. W. Clark for his timely assistance in affording Sir Francis Lovell so pleasant an occasion to bring forward the claims of their institution.

### A PAPER ON YAWS.

By J. Numa Rat, M.R.C.S.

Medical Officer, Leeward Islands, West Indies.

THE object of this paper is to summarise the additions made to our knowledge of yaws since 1891, and to deal with certain points regarding its nature which are still under discussion.

### GEOGRAPHY.

The doubts entertained regarding the identity of the Paranji of Ceylon and the Coko of Fiji with yaws have been removed by the testimony of Sir William Kynsey and Dr. Daniels, and it is evident that the conclusion of Dr. Nicholls, that yaws did not exist among Asiatics to any great extent, was arrived at in ignorance of the fact that twelve years previous to the publication of his report in which this conclusion is expressed, Dr. Charlouis had described it as being widely prevalent among the Javans and Malays of the Indian Archipelago. Dr. Arthur Powell has also given us an account of an epidemic of the disease observed by him in Assam.

### Nosology.

The position which yaws should occupy among classified diseases is a subject which has not received from recent writers the attention it certainly deserves. There was considerable diversity of opinion among observers at the end of the eighteenth and the beginning of the nineteenth century as to the true nature of the affection, some regarding it as one of the Cachexie, and others, as one of the Exanthemata. Hirsch (1885) describes it as distinguished from syphilis by having none of the properties of a constitutional disease, and having markedly the character of a local malady. Nicholls (1893) is of opinion that it may be either a local or a general disease.

Yaws is certainly not a cachectic disease. Like

syphilis it resembles the exanthemata, and, like that disease, it is capable of producing a cachetic condition of the system.

Those who consider it is a local malady only must ignore the constitutional symptoms that attend its development, and those who maintain that it may be either a local or a general disease base their opinion on the alleged absence in many cases of any constitutional disturbance. But the truth in this connection is that the experience on which statements with regard to its early symptoms are founded is very rarely personal. It is only after the general eruption has reached the fungating stage that patients generally come under the observation of medical men, and thus the conclusions of the profession relative to its preliminary constitutional effects are derived in the large majority of cases from the unreliable accounts of ignorant patients.

Inoculation experiments have supplied us with trustworthy information on this point. Charlouis show that in twenty-eight out of thirty-two persons inoculated there were "initial phenomena," comprising evening pyrexia, pains in the bones and gastric disturbance. But there is considerable difference in the statements of observers regarding the frequency of constitutional symptoms. Maxwell states that "yaws is generally preceded by symptoms of constitutional derangement." Bowerbank very briefly observes that after the incubative stage "there is an attack of feverishness with pains about the joints and shafts of the long bones." Charlouis says "it usually commences with fever" and pains in the joints; Imray, that "as a general rule, there is very little, if any, constitutional disturbance either during the period of incubation, or on the accession of the eruption." Dr. Nicholls refers to the "difficulty in determining the exact train of symptom antecedent to and immediately following the evolution of the eruption, on account of the rarity of the cases which come under the observation of medical men in the earliest stage of the disease." . . . . "Frequently, however," he adds, "there are osteocopic

pains, languor and debility."

"The invasion of the disease" he continues, "is doubtless in most instances marked by an elevation of temperature" which, however, may be so slight as to escape the attention of the patient. "In other instances, however, there is considerable constitutional disturbance which lasts from a few days to a week," and consists of continued pyrexia preceded by a rigor and the ordinary febrile phenomena.

It is evident from the above that further evidence is required to establish the alleged fact that yaws may develop without showing any constitutional symptoms and to prove that it may exist as a local malady only.

When yaws is attended by constitutional derangement, its course is like that of syphilis, and it should be classed with the latter.

### HEREDITY.

Hirsch (1885) writes: "The opinions are divergent as to hereditary transmission of the disease (congenitally at all events, it seems never to have occurred, as there is not a single case of that kind given in the whole literature)."

No evidence has been adduced since 1885 to show that the disease has ever been seen at birth.

Whether it can be acquired in utero and manifest itself after birth is a question to which a definite answer cannot be given. It may be that yaws acquired in utero may be retarded, like syphilis, through several years, but, unless this is proved, we must conclude that the disease so contracted will reveal its presence not later than the end of the longest known period between inoculation and the appearance of the general eruption. Maxwell's experiments (1839) led him to believe that the interval between inoculation and the appearance of the general eruption varied from six weeks to three months, and he says that though there is considerable variation in this respect due to idiosyncrasy and the state of the patient's health, all observers agree that this interval did not exceed three months. Charlouis (1881) gives the average period as three months, and, in some cases, four months.

Yaws, therefore (except as retarded yaws, if this ever occurs), cannot be considered to have been acquired in utero, if it should appear later than four months after birth.

But even in such a case there is the possibility of contagion during parturition to be taken into consideration. Maxwell refers to an attack of yaws in a child three months old (the earliest age at which he had known the disease to occur), which was supposed to have been contracted in utero, but with reference to which he suspected that "the mother had some remnant of yaws about the labia and that it had been communicated to the infant through the medium of a scratch in transitu." He considered that yaws was considerably modified during pregnancy and was never communicated to the feetus in utero.

It is possible that, as in syphilis, a child born of a mother who was suffering from recently contracted yaws during pregnancy inherits a certain morbid condition as the result of infection through the maternal blood, and that, instead of exhibiting all the phenomena of the disease, will, in course of time, be affected with some of the later manifestations only. This may, of course, be considered inheritance of the disease and may explain pathological conditions observed in persons who had apparently never suffered from yaws, which were attributed by some, in the early part of the last century, to leprosy, and by some, in modern times, to tuberculosis.

### ETIOLOGY.

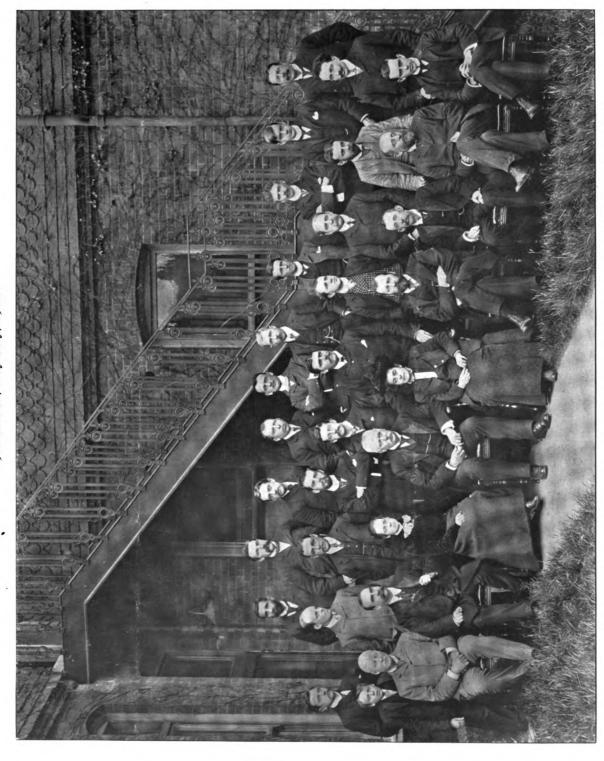
Nothing has been added since 1891 to our knowledge of the mode in which the disease is generally contracted. Its prevalence as an epidemic has suggested that yaws spreads by contagion, and possibly by infection. Inoculation experiments have confirmed the belief in its contagiousness, but we are still without any proof of its infectiousness.

Gavin Milroy (1873) questioned the contagious nature of yaws, or rather the truth of the belief that its prevalence was solely due to contagion, pointing out its frequency among the squalid and half-starved and its rarity among the cleanly and well-conditioned. Again, in 1879, he repeated his doubts on this point, and described the idea that contagion is the chief or

JOURNAL OF TROPICAL MEDICINE, JULY 1, 1902.

# STUDENTS AND SOME OF THE STAFF OF THE LONDON SCHOOL OF TROPICAL MEDICINE.

9th Session, May-July, 1902.



G. F. Leicester, Lewis Savin, C. W. Breeks, W. Russell, A. A. Woods, E. J. Hynes, R. D. Clark, W. J. E. Davies, J. K. Reid, A. Morley, H. F. Conyngham, C. F. Laselle, L. E. Hertslet, A. E. Druitt, J. O. Summerhayes, G. D. Warren, P. Michelli (Secretary), C. W. Daniels (Med. Superintendent), A. Castellani, Robert (2nd Lab. Assistant), Dr. W. G. Ross, Dr. Sambon, Miss H. M. Rowntree, Dr. Manson, Miss E. N. Tribe, Captain G. Hodgkinson, R.N. (Member of Committee), Dr. M. F. Simon (Lecturer), Rev. W. E. Fay, 'G. C. Low (Cragg's Research Scholar).



sole cause of the extension and propagation of the

malady as "an unverified hypothesis."

This exemption of the cleanly and well-conditioned, even when they reside in the neighbourhood of those affected with yaws, or when, as in the case of doctors and nurses, they spend a considerable portion of their time under the same roof with yaws patients, leads to the inference that the disease is not infectious. It is also an argument in favour of its contagiousness, the immunity of the cleanly and well-conditioned being due to their avoidance of contagion, and the susceptibility of the squalid and half-starved to their uncleanliness and their liability to contact with those affected with the disease.

Nicholls (1893) considers that "the examples showing the operation of contagion by contact are so numerous that this method of propagation must be taken as established beyond doubt." Numerous successful inoculation experiments have certainly been reported by observers at different periods, and these undoubtedly suffice to establish the fact that yaws can be contracted by contact of one of its cutaneous lesions with an abrasion of the skin if such contact be as intimate and prolonged as that which obtains in the case of inoculation experiments. But they do not prove more than this. They do not prove that the affection can be contracted by contagion during the ordinary intercourse of everyday life. To all accounts of cases in which it is declared to have been communicated by one person to another it can always be objected that the disease was caused in both by microbes in the air, or the soil, or the water.

The facility with which the disease can be acquired, whether it pass from one person to another or be caused by the germs in the soil, or the air, or the water, depends on the condition of the skin, and the affection will be most frequently found in places in which skin diseases are most prevalent. It is most probable that whenever yaws becomes epidemic some skin affection, such as itch, has been previously

current in the locality.

Yaws is, generally speaking, far more common in the country than in the town, and while it may exist very extensively in some country district, there may not be a single case of it in a town only a few miles off. This is due in great measure to the fact, that country people (from the nature of their work in the fields) are more likely to suffer from injuries to the lower limbs than town people. It must be remembered also that the germs of the disease would find in the country conditions favourable to their development which are absent from towns, such as the shade and damp of deep valleys.

The above considerations lead me to believe that the affection in most cases originates with the entry of its germs from the soil into the skin. The amount of contact between individuals which is necessary for its transmission does not obtain in everyday life to the extent that would explain either its ordinary frequency or its periodical dissemination as an epidemic. But the development of its microbes in the soil and their specially rapid multiplication at a certain season would fully account for both.

Some observers have reported having found in the tissues micro-organisms which they consider to be the cause of yaws. Pierez (1890) was the first to report the existence of micrococci in the yaws tubercle. Nicholls (1893) also claims to have observed a micrococcus in the same. Breda (1895) gives an account of certain baccilli noticed by him in yaws tissues. Powell (1896) noticed in two cultivations from yaws a certain yeast whose cells lay in the granuloma. But in none of these cases has the microbe been proved to be the cause of the disease.

In a communication on the histo-pathology of yaws by Dr. J. M. H. MacLeod, Assistant to the Dermatological Department, Charing Cross Medical School, to the section of Dermatology of the British Medical Association, the following observations appear: "A search for a specific microbe in these sections proved futile. An examination for a new micro organism in sections of tissues is unsatisfactory at any time, and in the skin, this is even more markedly the case." "We had no difficulty in finding microorganisms in the horny layer in a number of sections which we stained in diverse ways for the purpose, but we only found types which could not be distinguished in their appearance from those which occur in the normal epidermis, such as cocci, diplococci, sarcinæ, and a few short bacilli. We failed to find the yeast fungus of Powell, and without cultivation experiments were unfortunately unable to verify the frambæsiform bacillus of Breda or the micrococcus of Nicholls and Watts."

While the micro-organism of yaws remains undiscovered, the possibility of a protozoic origin of the disease should not be forgotten. Neisser confirmed the opinion of Virchow, Klebs and Bollinger, that the tubercles of molluscum contagiosum were due to the invasion of the dermal cells by gregarinidæ, and it is interesting to note, in view of the liability of fowls to an eruption which is like that of yaws in appearance and which some consider to have a similar origin, that Bollinger, who described the "contagious epithelioma" of fowls in his *These de Paris*, 1860, maintains that this affection is identical with the molluscum contagiosum of man.

### SYMPTOMATOLOGY.

Is there an **initial lesion** in yaws? Dr. Nicholls, on page 342 of his report of 1893, writes: "This matter has been alluded to in former places in this report, and I believe it has been proved that in the majority of instances yaws does not acknowledge a primary sore."

Tilbury Fox, in his work on skin diseases, writes as follows on the subject of inoculation: "Dr. Bowerbank tells me that if a poisoned wound be slight then little or no irritation may result and the part heals. But in other instances of inoculation the wound inflames and is covered with a brownish scab, beneath which is a small sore depressed in its centre and with raised everted edges and giving out ichor. This ulcer may heal up before the general cruption appears, but if large, this does not happen. In any case the primary ulcer becomes unhealthy when the general cruption appears and then fungated."

A similar account of what Dr. Bowerbank calls above "the primary ulcer" is given under the description of "Frambæsia," by Dr. James Christie, on page

395 of McCall Anderson's "Treatise on Diseases of the Skin" (1887), who refers to the ulcer at the site

of inoculation as "the primary sore."

Charlouis mentions, on pages 306 and 307 of the New Sydenham Society's translation (1897) of his report on yaws, three cases of inoculation with yaws, in each of which an ulcer developed at the site of inoculation; three others on page 310, with similar results; and, referring on page 311 to the inoculations practised by him on 32 convicts, states that only four of them failed and, with regard to the rest, that, "after the lapse of fourteen days after the inoculation small papules were always seen at the seat of injection." These papules became pustular at twenty days from the inoculation and finally developed into deep ulcers with mottled floors and undermined and thickened edges. He also reports, on page 313, similar ulcers formed in connection with seven other inoculations. He further writes: "In the majority of patients the earliest appearances of frambœsia showed themselves after three months, but in some instances after four months." The lesion at the site of the inoculation occurred "after the lapse of fourteen days after the inoculation," so that the general eruption did not appear until more than two months after the lesion. Should this, therefore, not be termed a primary lesion?

That this primary lesion is not generally observed in persons who have contracted yaws in the ordinary way may be easily explained by the facts that yaws patients are very seldom seen by medical men before the appearance of the general eruption, and that the virus usually enters through an ulcer on the foot or the leg. Even when such a primary lesion exists the patient would not connect it with the general eruption that follows. Ulcers are so common among negroes of the labouring class in places in which yaws prevails that but little notice is taken of so small a lesion. It is very seldom, indeed, that I have seen a chancre in a black man; and Dr. Nicholls records a similar experience on page 217 of his report of 1893. "It is extremely rare," he writes, "for the labouring classes in the West Indies to apply for medical aid in the treatment of primary syphilis. The lesion, indeed, is either overlooked or made light of, for the people are ignorant of its consequences and are unwilling to bring to the notice of a medical officer what they would consider so trifling a thing as a little hard lump or a little sore. Thus, in my own practice in Dominica, I have rarely met with primary syphilis, but the secondary and tertiary stages are fairly common." Such a fact might lead anyone to consider whether a primary lesion in yaws might not be equally over-

Dr. Nicholls's statement that, "should there be any growth at the site of the implantation of the virus, it differs in no essential particular from the characteristic eruption," is refuted by the results of Charlouis's experiments in which an ulcer developed at the inoculated point in every successful case. His argument that, as the growth at the site of inoculation is like the general eruption, therefore the former cannot be considered a primary sore, even if it were true, is one which might be similarly employed with regard to syphilis. For, if an erythematous eruption followed

looked or made light of.

an erythematous patch, or a primary lesion of any kind was succeeded by a general eruption of a like nature in a patient inoculated with syphilis, would it be wrong to call the local lesion a primary lesion?

When the primary sore of yaws fungates it does so only when it has lasted until the development of the general eruption, when the congested state of the skin at that particular point would necessarily be most favourable for the manifestations of the general infection.

It is evident that similar objections may be raised in other respects to the existence of a primary stage in syphilis. Even in venereal syphilis the primary lesion may escape detection, while in syphilis insontium it is seldom that it is recognised as such, and, when so recognised, it is most probably entirely uncharacteristic.

Dr. Nicholls refers to his inoculation experiments, reported on pages 244, 245, and 246 of his report of 1893, in proof of his statement that there is no primary lesion in yaws. These experiments were performed under conditions which render the value of their results extremely doubtful. The conclusions he has drawn from them are certainly very different from those to which the numerous experiments of Charlouis and other observers unmistakably point. In only two of the cases were the inoculations performed by him in healthy individuals, that is, in those who had not suffered from yaws or who were not actually suffering from the disease. In one of these two cases a "pimple" appeared at the site of inoculation and appeared at the site of inoculation and developed into a tubercle, which disappeared by absorption, and a similar result followed in the second case. With respect to the other cases, there were lesions at the points inoculated in three instances. So that even as regards these inoculations, in five out of the eight persons inoculated there was evidence of a morbid process at the site of experiment. That a yaws tubercle developed at the point of entrance of the virus in those cases in which the persons were actually suffering or had previously suffered from vaws is easily explained by the existence of a general infection, which naturally produced its effects at the irritated point and modified the primary lesion.

But whether the morbid changes observed at the points at which the virus was inserted by Dr. Nicholls in his experiments were due to the action of the yaws virus introduced by him, or whether these persons were accidentally infected at those points by the microbes in the yaws hospital, or whether they only manifested symptoms of the disease from which they were already suffering, these are all questions which appear to me to be unanswered. Whatever may be the value of his inoculation experiments, those of Charlouis are a complete refutation of the statement that there is no primary lesion in yaws.

Exception has been taken by Dr. Nicholls to the statement that there is an erythematous or scaly eruption in yaws. The expression "erythematous or scaly" was used by Mr. Hutchinson in his preface to my essay, but I myself stated that minute red spots preceded the appearance of the papular eruption. "I must at once take exception to the accuracy of these terms as applied to the eruptions of yaws," writes Dr. Nicholls, on page 342. He then proceeds

to explain as follows: "The eruption which I have described as squamous is, of course, a scaly one, inasmuch as there is exfoliation of small flakes of necrosed epidermis. But partial or general desquamation is characteristic of many skin diseases, and it is simply an exaggeration of a physiological process that is always in operation in healthy individuals." admits that he has applied the term "scaly" to a certain eruption which he has described as observed in yaws patients, but he takes exception to the accuracy of the term as applied to the eruption of yaws. He further writes on page 285 of his report, "The squamous patches not only occur at an early stage of the disease, but they may persist throughout the attack, or appear as a distinct eruption at any period of its progress." The contradiction involved in these quotations is evident. Maxwell describes a scaly eruption in yaws "not unlike pityriasis versicolor" as one of the precursive eruptions in yaws, and there is undoubtedly a papulo-squamous eruption which sometimes persists long after the disappearance of the general eruption, especially about the elbows

and knees, where they simulate psoriasis.

With regard to the "erythematous" eruption, I would point out that Maxwell, in reference to what he terms the second variety of precursive eruptions in yaws, alludes to "the appearance on various parts of the body of numerous smooth, ovoid or circular blotches of a dark brown or dull reddish colour," and Bowerbank, in Gavin Milroy's report, page 55, gives the following account of the eruption which precedes the appearance of the yaws tubercles and follows the initial constitutional disturbance: "These symptoms" (those of the constitutional derangement) "precede or usher in the appearance of small flat spots, patches or blotches of a brownish or dark red-coloured efflorescence; they vary in size from the diameter of a pin's head to that of a pea or a three-penny piece. From these patches small, pimple-like bodies of a dark colour arise and project above the cuticle; in size and form they resemble small shot. These speedily enlarge into abruptly raised tubercles." Dr. J. M. H. McLeod, in his communication on the histo-pathology of yaws to the section of dermatology of the British Medical Association, in describing the histology of yaws squame thus writes: "The clinical appearance of the squame with its reddened, slightly raised and scaly surface was thus easily explained by the vascular dilatation, the deposition and infiltration of plasma cells and leucocytes, the epithelial proliferation, the interepithelial ædema, and the imperfect cornification.'

Other authors beside those quoted have referred to this hyperæmia or engorgement of the capillary plexus of the skin at various points accompanied by desquamation, but the existence of such a squamo-erythematous eruption is denied by others besides Dr. Nicholls. Charlouis, for example, writes as follows on the subject: "According to some authors the patient presents, as the earliest eruption of frambæsia, red spots, upon which the papules afterwards develop. I have not observed such spots, and in my experience, the formation of an arcola has only occurred when the papule had attained the size of a pin's head."

It is, of course, only on a sufficiently light-coloured

skin that these spots would be observable, but of their existence I have no doubt, though it is quite possible that they do not always occur. Shortly after reading Dr. Nicholls's remarks on the subject I saw such a squamo-erythematous eruption on a released ways postion tip St. Kitts

coloured yaws patient in St. Kitts.

I have described certain symptoms apparently due to yaws as forming a third stage of the disease, and exception has also been taken to the correctness of my views in this matter. These symptoms are subcutaneous nodules, which I termed "gummata," ulceration of the fauces, destructive ulceration of the limbs, causing their contraction and atrophy, periostitis, and exfoliation of bone. These symptoms Dr. Nicholls considers cannot be produced by yaws and must be due to either syphilis or tubercle. But he gives no other reason for this conclusion except the existence of the two last named diseases in places in

which yaws prevails.

If Dr. Nicholls could point out any symptoms indicative of syphilis or tubercle and of these affections only in those cases which he declares cannot be yaws, there would be some reason for his contention, but when in a case in which ulceration of the fauces has followed an attack of yaws and in which there is no evidence whatever of the previous or actual existence of syphilis, he attributes the lesion to the latter disease, his conclusion appears to me to be without foundation. His objection to a diagnosis of yaws in such a case because "there are no symptoms whatever concomitant with it to establish even the remotest relation to yaws" might be adduced with even greater force against the opinion that the symptoms are syphilitic. The patient at least had yaws before the ulceration appeared, though there were no concomitant symptoms of that disease, but there is nothing whatever to show that the patient ever had syphilis. Had the ulceration of the fauces followed an attack of syphilis, it would have been unhesitatingly attributed to syphilis, regardless of the absence of concomitant and confirmatory symptoms, but as it followed an attack of yaws it cannot be due to yaws.

But in denying that ulceration of the fauces is one of the later manifestations of yaws, Dr. Nicholls is contradicting others besides myself. Maxwell (1839) mentions excrescences in the throats of yaws patients which he considered were "not inappropriately likened to a piece of toasted cheese," and states that he has seen "the palate and fauces occupied with such excrescences when the dermoid tissue was very partially affected." "Occasionally a deep, excavated, yawy ulcer appears on the uvula or palate or back part of the fauces, sometimes at an early period of the disease, but more commonly at an advanced

stage.'

Dr. Imray, in Gavin Milroy's Report (1873), page 74, thus describes this affection of the fauces: "Although yaws break out more frequently about the face and forehead than perhaps on any other part of the body, yet it is rare indeed that the throat, palate, or nasal bones become affected. These parts may sometimes be involved when the malady has lasted for many months or years and the ulceration has become general; but such a consequence is by no means frequent." Imray also refers to the destructive

ulcerations affecting the bones which occur in yaws patients, "the specific nature of the ulcerations being indicated by the characteristic yaws showing itself here and there."

It is evident, therefore, that Maxwell and Imray—the former in 1839 and the latter in 1873—were not of the same opinion as Dr. Nicholls when the latter writes as follows, on page 343 of his report of 1893: "Mr. Numa Rat, therefore, in asserting that these symptoms are due to yaws, is only reviving old theories that were practically disposed of by authors at the beginning of the century."

Corroborative evidence of the occurrence of ulceration of the fauces, &c., as symptoms of yaws is supplied by Daniels, who thus writes in his Government Report on yaws, as observed by him in Fiji: "There are a series of pseudo-syphilitic phenomena met with in the natives, thought by some to have a connection with yaws. Syphilis is unknown among the natives."

"First among these is a destructive ulceration of the soft palate and fauces, and sometimes of the nose. With or without this there may be a destructive ulceration of the nasal cartilages resembling lupus exedens. Occasionally, either on the face or elsewhere, is a cutaneous affection resembling lupus vulgaris.

"I have twice seen this ulceration under 10, and it is common about 20. In rarer cases it occurs late in life, and in one woman, about 60, on whom I made a post-mortem, the laryux was involved; there were no tubercles in any of the organs, and neither gummata nor other signs of syphilis were present."

Professor Breda, Director of the Institute for Dermatology and Syphilis in the Royal University of Padua, in his "Contribution to the Study of the Brazilian Frambæsia" (1895), has described an ulceration of the soft palate, fauces and larynx which he has observed in Italians who have returned to their country from Brazil, where they some years previously contracted the disease.

The statement that yaws is not an ulcerative affection is true as the same is true of syphilis. But no one would deny that ulceration occurs in syphilis because it is not generally observed during its secondary stage. Syphilitic secondary eruptions may ulcerate, but ulceration is so much rarer in the secondary than in the tertiary stage, that formerly all ulcerative processes were ranked as tertiary. Similarly we find that the secondary eruptions of yaws do not generally ulcerate, but that they may ulcerate and that ulcerations occur during the later periods of the disease there can be no doubt whatever.

It need not be pointed out that the tertiary symptoms of syphilis are not the result of the persistent activity of the virus in the system, but are changes due to the condition in which the tissues have been left by the previous influence on them of a specific poison whose virulence has been expended. This condition is a cachexia, and those who attribute to cachectic diseases the symptoms which I have grouped to form the third stage of yaws might with equal force maintain that the tertiary symptoms considered as being caused by syphilis are due to cachectic diseases also. And this did occur in former times;

and even in the early part of the last century, and still later the tertiary symptoms of syphilis and those due to retarded hereditary syphilis were often assigned to leprosy.

There is nothing in the nature of yaws to lead us to infer that it is incapable of producing the symptoms attributed to it in its latest stage. On the contrary, it would be strange if a disease which bears so close a resemblance to syphilis in the earlier portions of its course should not continue to show the same resemblance to it towards its close. It would be surprising if a general disease like yaws prevailing among ill-fed and uncleanly people, and affecting the system for years, did not eventually induce a cachexia like that of syphilis.

### YAWS AND SYPHILIS.

The question whether yaws is syphilis modified by race and climate has been revived by Mr. Hutchinson's writings on the disease, and has given rise to much controversy during the past ten or more years. There are, however, two other questions which may be asked in this connection, and these are: Is syphilis yaws modified by race and climate? and, are yaws and syphilis modifications of a third disease? The proposition that yaws is syphilis modified by race and climate implies that syphilis originated in a non-tropical climate; but the suggestion which I was the first to make, that syphilis is a modified form of yaws would accord with the more general view that syphilis passed from the tropics to northern latitudes. I will limit myself, however, to a consideration of a fact which has been adduced in support of the contention that yaws and syphilis are, as they now exist, different diseases.

An apparently very effective demonstration that yaws and syphilis are different diseases has been given by Charlouis, who reported in 1881 that he had successfully inoculated a yaws patient with syphilis. This experiment and cases related by him and Powell, in which two men while suffering from yaws contracted syphilis, have been referred to very recently as very clearly showing the distinction between the two diseases. If such an experiment implied that two constitutional or general diseases had been found to exist concomitantly in the same patient, we should only need a few more examples of the same kind to settle the yaws-syphilis question. But the significance of this experiment, and the cases mentioned above in connection with it, is materially lessened when they are considered in connection with the opinions of those who hold, like Hirsch, that yaws is a purely local affection, and, like Nicholls, that it is sometimes a local, and sometimes a constitutional disease. If yaws exists in a patient as a local disease, as merely a skin affection, then the development of syphilis in such a patient would not be stranger than the appearance of syphilis in a person suffering from any skin disease. Similarly, from this point of view, when yaws is acquired by anyone affected with syphilis, we have the co-existence of a local with a general disease.1

<sup>&</sup>lt;sup>1</sup> Dr. Nicholls sees an analogy in this respect between yaws and tuberculosis. We may hence infer that as there are instances, though rare, in which a tuberculous skin disease has

But even when yaws and syphilis are concomitant as constitutional diseases, the stage of the one first acquired should be taken into consideration in estimating the value of such cases as those above mentioned. We do not know at what period of its course the virus of yaws as a constitutional disease loses it activity. The patient (Kamono) who was inoculated with syphilis by Charlouis had been suffering from yaws during four years before the date of the experiment. Evidently, therefore, sufficient time had elapsed to render it probable that the yaws virus, if the disease had been a general one, had ceased to exert its influence on the system generally, and that its action was then limited simply to the cutaneous tissues. It is true that the patient had been inoculated a second and a third time with yaws, first with the softened crust and blood from a fungous tumour growing in his own skin, and next with the blood of another person suffering from yaws. Both the inoculations were said to have been successful; but the only symptom given in support of this assertion was the development of an ulcer in the first case at the site of inoculation, and the appearance of fresh tubercles whilst others were disappearing; and in the second, the development of a definite fungating growth with the characteristic crust at the point of entrance of the virus.

It is plain that in neither of these experiments can it be definitely asserted that yaws was successfully inoculated as a general disease. The occurrence of a fungating growth at the site of inoculation cannot possibly be considered sufficient evidence of the development of a general affection, and the appearance of fresh tubercles whilst others were disappearing might have been caused by the yaws

contracted four years previously.

To be convincing, a similar experiment must be performed under conditions which leave no doubt as to the constitutional nature of the diseases inoculated. A person must be first inoculated with yaws and definite constitutional symptoms must manifest themselves before the inoculation with syphilis or vice versa, and also the second inoculation must be performed within such time after the first as will ensure the existence of the virus of the latter in the system in an active form.

I will close this paper by considering the differences which appear to me to exist between yaws and syphilis. The following are the most important of these differences:—

(1) Yaws is limited to the tropics.

- (2) It may be either a general or a local disease.
- (3) Its micro organism may exist in the soil.

(4) It is not hereditary.

(5) It is rarely contracted by sexual intercourse.

(6) It is rarely observed in infancy.

(7) It is commonly met with between the end of infancy and the tenth year of life, as many as 51 per cent. of the cases occurring during that period.

(8) It is only about 8 per cent. of the cases that

occur between the twentieth and thirtieth years of life.

- (9) Its primary lesion is a soft ulcer and never an indurated chancre.
- (10) Its primary lesion appears two weeks after inoculation.
- (11) Its secondary eruption does not show itself until about ten weeks after the appearance of the primary lesion.

(12) Its secondary eruption is not symmetrical.

(13) Its secondary eruption is monomorphous, the squame, papule and tubercle being stages in the development of the characteristic fungating growth.

(14) Its secondary eruption is characteristically

fungating.

(15) Its secondary stage is never attended by lesions of the mucous membrane of the fauces.

(16) It never produces any eye affections.

(17) It never invades the viscera or the nervous system.

(18) It attacks bones not from within but from without by extension of the inflammation excited in the

neighbouring cutaneous tissues.

(19) It presents the following histo-pathological differences from syphilis: Positive — (a) Greater extravasation of polynuclear leucocytes; (b) marked hyperkeratosis; (c) more pronounced proliferative changes in epithelium (except as regards condylomata). Negative—(a) Infiltration of plasma cells less dense; (b) linear arrangement of these rarely noted; (c) giant cells and chorisplaques never observed; (d) no fibrillation of the plasmomata; (e) no transitional branching connective tissue cells; (f) collagen less resistent and never organised; (g) no intracellular hyaline degeneration or colloidal degeneration of the fibrous stroma; (h) marked thickening or endothelial proliferation of the vessel walls not occuring to any extent.

The chief histo-pathological differences between yaws and syphilis, besides hyperkeratosis, are the absence of fibrillation in the growths of the former, which I pointed out in my essay in 1891, and again in my paper on yaws, contributed to the International Congress of Dermatology of 1896 (page 327), and of any intracellular hyaline degeneration or colloidal

degeneration of the fibrous stroma.

The above differences are taken from the contribution to the histo-pathology of yaws, by Dr. J. M. H. MacLeod, already referred to. His study of the histology of the disease is exhaustive, and should be highly acceptable to those who are interested in the subject. He expresses the following opinions with regard to yaws and syphilis: "The differentiation of the yaws granuloma from the granuloma of syphilis requires even greater attention to detail than is necessary in the case of the other granulomata which have been maintained, and sections may be found, though they are, in my experience, the exception, from which it would have been impossible to venture more than a tentative opinion regarding the diagnosis.

"Though the histological differentiation may be extremely difficult and at times practically impossible, still in sections in which the peculiar characteristics of yaws are well marked, it should be no more difficult to differentiate yaws from syphilis histologically

occurred in a patient, the subject of general tuberculosis, and vice versa, yaws may exist simultaneously in the same patient as a local as well as a general disease.

than it may be to distinguish between the histological

pictures of tuberculosis and syphilis."

After a perusal of Dr. MacLeod's elaborate and most instructive description of the histological appearances presented by the pla-momata of yaws, one cannot but feel that, though he has pointed out several differences as regards the proportion and relative distribution of the elements which constitute the granulomata of yaws and syphilis, respectively, his account of the structure of the frambœsial plasmona has emphasised the resemblance already observed between the two diseases.

### Correspondence.

To the Editor of the Journal of Tropical Medicine.

SIR,—As a constant reader of the JOURNAL OF TROPICAL MEDICINE, allow me to express my surprise at the terms in which you describe the recent action of the Society for the Suppression of the Opium Trade. To note only one expression, which may be taken as including all the rest, you describe the Society's action as "one, in fact, in which Government officials are flouted as consummate liars." Surely, Mr. Editor, you cannot be justified in this description? You are at perfect liberty to dispute the position which the Society has assumed in calling attention to a notorious fact. That fact is, that whereas the late Mr. W. H. Smith and Mr. Gladstone, both of them in their position as leaders of the House of Commons, distinctly stated that British Government policy was one of gradual restriction of the growth of the poppy in India, the actual condition of things, twelve years after Mr. W. H. Smith's statement, is that a larger area than ever is under poppy cultivation. You may agree with Lord Geo. Hamilton that he "cannot admit that there is any pledge of this kind which is operative at the present time or binding on the Government," but surely we do not charge either him or other Government, but surely we do not charge either him or other Government officials with being "consummate liars," when it is urged that the policy of "this present time" is in direct contradiction to the avowed policy of ten years ago. The fact that Lord Geo. Hamilton has to use such language with regard to previous Government pledges as that they are not operative or binding on the present Government is proof that the Anti-Opium Society has good ground for its action, and that there is ample room for two opinions regarding these pledges. The Society has given no ground for any fair use of such language as you apply to it.

As to the subject itself, it is quite true, as you put it, that

As to the subject itself, it is quite true, as you put it, that there are two questions, the one the relation of England and its Government to the opium trade, and the other, "the deleterious influence opium causes in China." But while you aver that these two questions have no direct or indirect bearing on each other, we assert the exact opposite. If cause and effect have no direct or individual bearing on each other, then England's opium policy and the opium misery of China have no relation. We assert that there is no single factor in the history of the last hundred years which has so powerfully contributed to the present opium misery of China as England's action (1) in the long and painful story of the opium smuggling traffic which led to the war of 1839-40; (2) in her continued refusal, after her victory, to bring the smuggling traffic to an end; and (3) in her refusal, after the legislation of the trade, to listen to the repeated entreaties of the Chinese Government to enter on some course which would bring the Indian opium trade to a close, a refusal which, in the counsels of Chinese despair, led to the awful spread of the

poppy growth in China itself.

And we assert further, and emphatically, that if England

is to put herself in anything like righteous relations with China, and do something, instead of talking about it, which shall help China to reform, then her first step will be to bring to a close the Indo-Chinese opium trade. I do not like to follow you, Mr. Editor, in the use of hard speeches, but if there is one thing in our country's history which deserves the name of "indescribable meanness" it is her opium policy towards China.

49, Highbury Park, N. JAMES L. MAXWELL, M.D.

June 10th, 1902.

### Current Miterature.

### PLAGUE.

### PREVALENCE OF THE DISEASE.

India.—During the weeks ending May 24th and May 31st the number of deaths from plague throughout India numbered 5.498 and 4,214 respectively. The decrease is marked, but the figures remain a long way above the corresponding period of last year, when the weekly return gave 1,658 only.

EGYPT.—During the weeks ending June 1st and 8th the fresh cases of plague in Egypt were stated as 14 and 4 respectively; and the deaths from plague during the same periods were 6 and 2 respectively. On the 8th of June 16 cases remained under treatment.

CAPE OF GOOD HOPE.—During the three weeks ending May 17th, 24th, and 31st the fresh cases of plague in Port Elizabeth, where alone the disease occurred, were 2, 1, and 0 respectively. During the same weeks the deaths from plague were 2, 0, and 0 respectively. Since the commencement of the outbreak 897 cases of plague have occurred in Cape Colony, of which number 431 died of the disease.

Hong Kong.—During the three weeks ending June 7th, 14th, and 21st, the reported cases of plague in Hong Kong numbered 53, 39, and 49, and the deaths from the disease 52, 39, and 51 respectively.

### Subscriptions.

### POST FREE.

### Notices to Correspondents.

1.—Manuscripts sent in cannot be returned.

in advance.

2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Editors.

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

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### Original Communications.

### THREE LECTURES ON BILHARZIA,

Delivered at Kasr-el-Ainy Hospital, Cairo.

By Frank Milton, M.R.C.S.

Surgeon to the Hospital.

LECTURE III.

### TREATMENT.

Gentlemen,—We have now come to the most interesting, although at present the most unsatisfactory, part of our subject, namely, the treatment of bilbarzia under its various manifestations; the subject is unsatisfactory, because up to now we have got no means of attacking the cause of the disease and really curing the patient; but it is also most interesting, for the means may yet be found by which the patient may be rid of his unwelcome guest; and I can guarantee a fortune waiting for any one of you who can find means of killing the bilharzia worms in the veins of a human being without danger or risk to the host. Although as yet we are unable to radically cure the disease, still there are many things which we can do to mitigate the severity of its symptoms, and even in some cases to effect a cure, for in cases in which the fresh supply of eggs has been cut off owing to the death of the parent worms, the changes induced by the eggs previously deposited in the tissues which Nature unaided is unable to remedy may often be overcome by art. It has been advocated by some practitioners that injections of various chemicals and antiseptics should be made into the tissues, or even directly into the veins of the portal system, in order to kill the parasite, but happily I do not think those who advocate this method have ever had the courage of their convictions sufficiently strong to carry out their own proposals, and we may lay it down as a fact that at present there are no means of directly attacking the parasites themselves. The most recent suggestion of

this sort has been the subcutaneous injection of a solution of quassin, a principle obtained from quassia, with the idea of its absorption by the blood and the exertion by it of a vermicide action on the parent bilharzia; but although this may well be a step in the direction of a radical cure of the disease, I have not so far heard of any great success having been obtained from its employment. Quassi itself does not appear to be a very powerful vermicide, it being used as are decoctions of green tea, salt water and other mild anthelmintics, chiefly to destroy thread-worms, and does not appear to have much effect upon any other form of parasite; and if it requires a large enema of a strong decoction of quassia to kill a few threadworms, I doubt if 0.002 of one of its principles transmitted through the whole bulk of the human body would prove to be more than a passing annoyance to a colony of bilharzia worms. I think from what will be seen later of the effect of the extract of male fern on bilharzial hæmaturia, that possibly subcutaneous injections of its active principle, filicic acid, would hold out more prospect of success, but I do not know that this has ever been tried.

All attempts at treatment, then, must resolve themselves into treatment of symptoms, and we will therefore deal with the symptoms according to locality, taking the organs in the same order as before, beginning with the bladder. For the early hæmaturia many methods of treatment have been advocated, especially injections into the bladder of astringent solutions, such as solutions of silver, zinc, and copper salts, and most of the solutions have been vaunted at one time or another as being certain of success; but before accepting these assurances of a beneficial result we must remember two things, first, that the hæmorrhage due to bilharzia is not always continuous, and it fairly frequently ceases for a time without any apparent cause; and secondly, that although the injections may control the hæmorrhage during their application, they cannot possibly cure it, as they are unable to do away with the immediate cause, unless they were

employed strong enough to exert sufficient influence on the mucous membrane as to alter its condition radically, which would be replacing one abnormal condition by another and probably a worse one. There is no doubt that relief may be afforded to the patient by washing out the bladder with mild antiseptics, such as boracic acid or boro-glyceride, but this will be due to the soothing action of the solution on the irritated bladder coats, and not to arrest of the disease. There is one preparation which, after long trial, I do really think can be relied upon to control the hæmorrhage, and whose effects would seem to be rather more than temporary and passing, although how it acts I am quite unable to say, and that is the liquid extract of male fern given in doses of 1 gramme three times a day. Over and over again in cases of simple bilharzial hæmaturia I have seen it act like a charm, controlling and abolishing the hæmorrhage within a day or two of its first administration, and relieving the bladder irritation at the same time. Being a powerful anthelmintic, and having so great and immediate an effect over a parasitic disease due to the presence of worms in the body, one would like to believe that it has the power to influence or destroy the parasite by being absorbed into the blood and acting directly upon the worm; but the very rapidity with which the results of the treatment are obtained is against this, for if the supply of eggs were suddenly to cease owing to the death of the parent worm, the changes set up by eggs already deposited in the tissues would still continue to give rise to the usual symptoms due to their presence until sufficient time had elapsed for them to be gradually got rid of in the ordinary way of Nature. It is therefore probable that the male fern acts in some way directly on the mucous membrane of the bladder and is merely a palliative agent and not a curative one.

As the disease advances the treatment consists more and more entirely in attempts to relieve the more urgent symptoms. The irritability and spasm of the bladder may be relieved to a certain extent by diuretic and emollient mixtures, and cystitis, which always occurs sooner or later, must be treated by washing out the bladder and the administration of urinary antiseptics, of which, in the majority of cases, salol in 0.75 gramme doses acts most readily and effectually. If calculi are formed they must, of course, be removed by crushing, and in this connection I think it may be laid down that bad cystitis amounting almost to disorganisation of the bladder is no bar to the performance of this operation, nor is it an indication for the performance of lithotomy rather than lithrotrity, for I think the practice of this hospital proves that unless the kidneys are already the seat of bad secondary disease or even of pyæmic abscesses at the time of operation, all patients on whom a carefully conducted lithotrity is done will recover and be immensely benefited, but that cases of severe cystitis who are cut for stone are very liable to die, exhausted, without any attempt at healing of their wound having taken The relief given to these patients by the removal of their stones is very great, and that lithotrity is an especially favourable means of removing them is, I think, proved by a lately concluded series of 124 lithrotrities which I have performed on patients with all degrees of cystitis without a single death, and

I am persuaded that by no other form of operation could these cases have been so successfully relieved.

The most difficult cases to know what to do with are the cases which come for treatment in the very late stages of the disease with disorganised bladders filled with bilharzial growth, and with constant passage of small quantities of foul urine with extreme suffering. The question in these cases is simply whether the bladder should be drained in order that the patient may be relieved of his constant tenesmus, or whether the patient shall be left to suffer unrelieved, for no treatment except drainage holds out any possibility of relief. If it were merely a question of making a perineal opening which was to remain patent for the rest of the patient's life, it would be a sufficiently serious thing to face, but one which in the majority of cases would be welcomed by the patient and which would be amply justified; but in reality it is much more than this, for it will be found that in nearly all cases in which the disease is far enough advanced to justify permanent drainage, the vitality of the growth filling the bladder is, owing to its own bulk and bad blood supply, so low that the mechanical injury necessary in introducing a large drainage tube and the irritation due to its retention in the bladder sets up a necrosis of the growth which sloughs and is then thrown off in masses. This extensive sloughing is necessarily a heavy drain on the strength of an individual whose resistance is already much broken down by his existing disease, and it will often prove too great to be borne and the patient will die, the operation being the direct cause of the shortening of a life miserable in the extreme, it is true, but still a life which the owner would not, even in his extremity, willingly give up. A certain proportion of the cases submitted to the operation of perineal drainage manage to survive the process of sloughing, and if they do this their condition after the loss of the mass of diseased tissue encumbering the bladder is very greatly improved and they pass the remainder of their life in a state of comparative comfort, but necessarily with an ever discharging urinary fistula in their perineum, for I do not think the drainage tract once fairly established will ever close, and it is certain that the remains of the bladder left after the sloughing of the whole of its diseased mucous membrane can never regain its functions as a contractile reservoir, but must remain a passive receptacle through which the urine passes. As far as I know there is no means by which it can be even approximately foretold if a given case will be capable of surviving the sloughing of the mucous membrane as represented by the mass of growth or whether the patient will succumb, for it will be found that some of the most miserable, broken-down patients, in whom the only apparent justification for the operation is to render death easier, will survive and regain their health and strength to a most extraordinary degree, whereas others in a comparatively fair state of general health will die rapidly as soon as the sloughing has fairly set in. Probably the result of the operation depends entirely upon the amount of damage already done to the patient's kidneys, but where the urine discharged from the bladder is represented by a quantity of stinking fluid, whose very amount it is impossible to measure with any accuracy, and whose

condition before its entry into the foul bladder it is impossible to ascertain, no certain indication can be obtained as to the state of these organs, unless, of course, they be found to be grossly hydro- or pyonephrotic, and even this condition which, where it exists, can be ascertained by direct examination is not so prejudicial to the patient as a kidney whose substance is riddled by minute chronic pyæmic abscesses, and which cannot be detected by palpation during life.

If drainage of the bladder is to be done at all, I very much prefer drainage through the perineum to drainage above the pubes. I see nothing to be gained by a suprapubic opening, and the patient is much more easily kept dry and comfortable if the opening is in the perineum; besides, the drainage is very much more efficient by the perineal route, the passages being near the lowest part of the bladder instead of at its highest. The operation I prefer is the old Cock's puncture through the perineum, with the introduction of two moderate-sized drainage tubes, whose introduction, by the way, is much assisted by oiling their ends, retained in place by a silkworm gut suture through each, and cut long so as to lie in a urinal between the patient's legs when he is in bed. The operation is extremely simple, and does away with the introduction of any unnecessary instruments into the bladder or down the diseased and probably tortuous urethra, and the opening into the bladder is the shortest possible, and in a direct line from the surface to the cavity to be drained. The double tube facilitates washing out, which is most necessary, not only for the purposes of cleanliness, and as far as possible disinfection, but also to keep the tubes from being blocked by blood-clots during the first day or two after the operation, and to remove sloughs later on. I generally retain the tubes about eight or ten days, after which period it will be found that their track will remain open and without much tendency to contract, and the opening will remain quite sufficiently free for the passage of the urine and of any sloughs that may still have to separate; of course, from the moment of coming under treatment the patient's strength must be kept up, and as far as possible increased by as much simple nourishment as he can by any means be induced to take and digest, and the most constant attention must be paid to the state of his dressings and bed to keep him free from the irritating urine, or sores will quickly develop in his badly-nourished skin.

The treatment of acute retention of urine when complicated with hæmorrhage is, necessarily, also by perineal section or Cock's puncture. In these cases the passage of a catheter is followed by no relief, for even with the employment of the largest instruments either no fluid can be drawn off, or if the urine does begin to escape the flow is soon arrested by the catheter becoming blocked with clot, and even repeated washings with hot water or weak antiseptic solutions, with the idea of breaking up the clot, will not give really satisfactory results, for it is almost, if not quite, impossible to evacuate the whole contents of the bladder in this way, and even if the attempt were successful and the bladder completely cleared, it is not at all sure that the hæmorrhage would not continue, or recommence, and the process of evacua-

tion have to be undertaken again. Whereas by an incision in the perineum the bladder can be thoroughly evacuated in the shortest possible time and with the least possible suffering to the patient, and should the hæmorrhage recur the part is entirely under control and everything in condition for immediate further treatment. In these cases I prefer to do a median perineal cystotomy on a staff, rather than a Cock's puncture, for the extra room given by the larger incision is of great help in the manipulations generally necessary in removing the clot. Having made your opening into the bladder, you should introduce your finger through the wound and thoroughly break up the clot, not being more rough than is absolutely necessary, for you must always remember that you are dealing with a badly diseased part and one which very easily sloughs, for these cases of hæmorrhage with retention only occur in advanced cases with an excess of growth. You will find that masses of growth readily come away, and it is very tempting to go on and try to clear out the whole of the diseased material; but this is a mistake, for although you may in this way remove large quantities of bilharzia matter, you cannot remove the whole, and the accompanying hæmorrhage although not excessive is of serious moment to the patient iu his broken state of health. The thing to do, then, having once broken up the clot, is to introduce through the wound two fullsized lithotrity evacuating catheters and wash through them alternately with a large quantity of saline solution, continuing to wash through until the water is returned clean, and then to fix in two moderate-sized drainage tubes as in the case of drainage of the bladder. It will generally be found that with a free exit for the urine the hæmorrhage stops, but should it recur, the best method is to again wash out the bladder through the tubes with a solution of creolin, either at a temperature of 40° to 45° C., or with the same solution iced.

The treatment of urethral urinary fistulæ due to bilharzia is, on the whole, more encouraging than the treatment of any other form of bilharzial infection, for in the majority of cases the patients can be cured, at least of their local disease, and the treatment is really of the simplest, and consists in the free and wide excision of the fistula and its surrounding tissues. Of course, in some of the most severe cases of fistula, when the patient's perineum and even nates and thighs are a mass of fistulous openings, this free and wide excision is impossible, and we must be content with more imperfect operations; but even in these cases, with patience and endurance on the part of the patient, and perseverance and ingenuity on the part of the surgeon, the worst cases may be greatly benefited and often cured. In the great majority of cases of urinary fistula it will be found that there is no stricture present, and this fact greatly increases the prospect of cure. In many cases where a stricture would seem to be present, and where a small-sized catheter is obstructed, a No. 12 English metal catheter may be passed with ease, the obstruction being due to distortion of the canal and not to stricture. In some cases true stricture will be found, and where it does exist cure is very difficult, both as regards the fistula and as regards the stricture, but even in these cases,

if everything else fails, much may be done to benefit the patient by substituting a direct, fairly healthy escape for the urine through the perineum in place of. as is usually the case in these patients, a number of unhealthy, badly-placed and tortuous fistulous openings. As we have seen, stricture only occurs in roof fistula as the result of very extensive infiltration and destruction of a large part of the urethra, and is therefore practically incurable, for the part of the urethra which has been destroyed is only represented by the ordinary granulation tissue entangled, as it were, in a fibrous network such as forms the lining of bilharzia fistulæ, and although an instrument may be easily forced through this tissue there is not sufficient coherence in the tissue itself to even permit the formation of a canal in it. As a rule, then, stricture accompanies floor fistula only, and is due to the alteration of the walls of the urethra by chronic inflammation, the result of the constant passage of the irritating discharges from the progressing fistula, and here also the change is so extensive and the alteration of the part so profound that these strictures are the most intractable with which we have to deal, for although a passage may be forced through the infiltrated and narrowed urethra, and the catheter maintained in position for a length of time, yet when the instrument is at last withdrawn the canal will for a certainty contract again immediately to its former dimension.

In a case of fistula or fistulæ in the perineum without stricture the method of operation is as follows: The patient, being anæsthetised, is held in the lithotomy position and a full-sized metal catheter is passed into the bladder; an area of skin is then marked out with the scalpel, including, if possible, all the fistulæ present, with a fair margin of skin around them. It will generally be found that the incisions have to be made extending to both sides of the middle line and often encroaching upon the scrotum above and coming The incisions are then near to the anus below. carried boldly down through the tissues, and gradually sloping somewhat towards the middle line until the level of the urethra is reached. The bleeding, which is free, is easily controlled by picking up the vessels as they are cut through, and no attention need be paid to anatomical details which have already been modified by the bilharzia infiltration. Having reached to about the level of the urethra, this canal is to be searched for and then carefully isolated and cleaned of infiltrated and thickened tissue which, if you find the right line of cleavage immediately on the urethra itself, is very easily accomplished. It will then be found that the granulating tract of the fistula, which up to this point should not have been seen as it should be hidden well in the centre of the block of tissue being removed, passes on one side of the urethra round to its upper surface. As this part of the tract cannot be cut away without doing serious damage to the surrounding parts, the operator has to content himself with thoroughly scraping it out with a sharp spoon until every visible vestige of granulation tissue has been removed. The larger vessels, which have been divided in the course of the operation, are then ligatured, and the wound plugged widely open with antiseptic gauze. In the perineum the whole wound

should undoubtedly be left open whatever its size, but if the wound has extended into the scrotum the skin in this, the upper part of the wound, may be sutured, provided always that wide access be left to the deepest parts of the wound leading to the exposed urethra. The wide open wound will naturally take longer to granulate up than if the sides were allowed to approximate to some extent, but it will be found that what is apparently lost in time will be more than regained in certainty of cure, for it must be remembered in the deepest part of the fistula, the removal having been by means of the sharp spoon and not by the knife, it is pretty certain some of the granulation tissue will have been left, and this and the roughly-treated healthy tissue in its neighbourhood will have to be thrown off by suppuration, which can only be done satisfactorily upon what is rendered as nearly as

possible an open surface.

In Europe and in non-bilharzial countries generally urinary fistula is always due to stricture, either gonorrhoeal or traumatic, and the routine method of treatment is to dilate the stricture, incise the fistula, and tie a catheter in the urethra until healing is well The same methods have been followed advanced. in treating fistula due to bilharzia in this country, especially as regards the tying-in of a catheter after operation, but I think this is a mistake, and I think the practice is not only needless but even harmful. The ends aimed at by those who tie in a catheter are two: first, to maintain or restore the calibre of the urethra, and second, to prevent the escape of urine through the wound and possible interference with the healing process owing to its irritative properties. Of course, where a dilatable stricture exists the practice is proper and necessary in order to provide a free exit for the urine other than by the fistula; but, as I have stated above, in the majority of cases of bilharzial fistula no stricture exists and so dilation is unnecessary, or where true stricture does exist it is by its nature so undilatable that its condition cannot be improved by the passage or even the retention of instruments, and as regards the maintenance of the calibre of the urethra after operation, the opening in the urethra, especially in roof fistula, is as a rule small and situated in the long axis of the canal, so that the amount of contraction due to its healing is altogether unimportant, and does not require special treatment for its prevention. Again, I do not think that any catheter tied into the urethra, however tightly it may be grasped, will drain away the whole of the urine after the first twenty-four hours, but in every case it will be found that a certain amount of urine will find its way along the side of the catheter and escape from the fistula if such exists; and again, provided the urine has a free and unobstructed outlet I do not think it will irritate even freshly-cut tissue. On the other hand, the presence of a rigid catheter in his urethra is intensely painful and very annoying to the patient; it causes him to maintain an extremely rigid and fatiguing position in bed, and it is very difficult to manage properly from the point of view of emptying the bladder, and after a very short time it will set up urethritis and probably increase the irritability of the already diseased bladder. Owing to these facts I never tie a catheter in after operating for fistula,

and I do not think I have ever seen a case where the advantage of keeping in an instrument would not have been outweighed by its very serious drawbacks.

In the unfortunate cases where the urethra has been completely destroyed in whole or in part the procedure to be adopted is to excise the fistulæ, which in these cases are usually multiple, in the thorough manner described above and to leave the healing process to go on until the wound has closed as far as it will, when there will remain a sound scar perforated about its centre by a fistulous opening, which will remain permanent and over which the patient will, as a rule, have a fair amount of control, seeing that its origin is in the urethra well in front of the prostate. No special means need be taken at the time of the operation to provide an epithelial-lined course for the new fistula, as it will be found that after a certain period there will be no further attempt at healing and the fistula will remain permanently open.

It will at times happen with very extensive disease and widely-distributed fistulæ that the operation will have to be repeated, occasionally several times over; but there are, on the whole, few cases that cannot eventually be cured, provided always that there is no bad stricture of the urethra; and still fewer that are not capable of great improvement, even in the pres-

ence of an obliterated urethra.

The most difficult cases of all to deal with are the cases where the opening in the urethra is in the usual position just in front of the bulb, but the disease, instead of making for the nearest skin surface, has travelled along the under-surface of the corpus cavernosum and has made its exit in front of the scrotum or on the pubis. Scraping, excising, and plugging, however thoroughly done along the course of the fistula, even in conjunction with a wide counteropening in the perineum, will never succeed in curing these cases, and the sole method to be adopted is to boldly slit up the scrotum in its whole length, dividing it into two separate parts along the raphé, and to expose the whole length of the fistula, to plug the wound open and leave it to granulate up in its whole extent, not venturing even to approximate the two halves of the divided scrotum until the granulations have filled up the cavity well above the level of the urethra.

The treatment of floor fistula differs from that of roof fistula owing first, to the presence of stricture, and secondly, to the large amount of dense fibrous tissue between the surface and the urethra, rendering the definition of this canal very difficult. The treatment of the stricture itself need not detain us, for as a rule it will be found to be quite undilatable if it is of any standing, and owing to its extent it does not lend itself particularly well to any cutting operation, or rather, perhaps, the only cutting operation likely to be of any avail is that shortly to be described, as done at the time of operation for the accompanying fistula. Before considering the treatment of the true and complete floor fistula we have first to describe the treatment of the incomplete fistula whilst it is still in the form of a peri-urethral abscess. We described these abscesses in a former lecture as consisting of a dense mass of new fibrous tissue forming a tumour of stony hardness, and having in its centre a cavity containing stinking pus, and the object of your treatment

must be not merely to evacuate this pus, but also to remove the whole of the fibrous tissue enclosing it as well. To do this you must make a free incision in the middle line over the tumour through all the overlying tissues, into and through the whole extent of the tumour itself and into urethra, which you incise in its long axis through the whole extent of the tumour and clear beyond it at either end, this incision will pass through the opening of communication between abscess cavity and urethra, which will be bound to be of a fair size, lying in the long axis of the urethra and with ragged, granulating edges. It does not much matter whether you have introduced a catheter into the urethra or not before beginning your operation, for the urethra has to be incised, and incised freely, and owing to the density of the overlying structures a catheter is of very little assistance in defining the position of the urethra, the true guide to which is the cavity of the abscess and its internal opening. You are compelled to incise the urethra itself because in these cases it is altogether impossible, working from the outside, to clear away the new tissue, for you are unable, accurately, to define the position of the urethra, and this uncertainty restrains your freedom of action so that either fearing to damage the urethra you hesitate to remove enough of the new tissue, or else in making too free incisions you may easily find that you have also removed a slice of the urethra, which loss in the already narrowed state of the canal is irreparable; whereas, if you split the whole of the fibrous tissue and incise the urethra freely in the middle longitudinal line you have the whole canal immediately under your eye and can define its limits and dissect away the whole of the new tissue from within outwards without any difficulty or hesitation, and the incision in the urethra instead of being prejudicial to the patient, is rather of an advantage, as it not only readily heals without any extra narrowing, but also partakes more or less of the nature of an external urethrotomy and probably increases the calibre of the urethra at this point as the scar tissue between it and the surface contracts. The treatment of the complete fistula does not differ from the treatment of the bilharzial peri-urethral abscess, except that the part to be removed includes an eliptical area of skin round the mouth of fistula, but the definition of this area had better be left to the last stages of the operation, and the first incision be made as for periurethral abscess in middle line, for if you begin by making incisions on the skin surface to include your fistula you will find that you are tempted to continue deepening these incisions and are led on further than you proposed, until you find yourself involved in an attempt to excise your floor fistula from without inwards, instead of, as you should, from within outwards, and you soon get into a state of uncertainty and indecision, consequent upon not knowing exactly where you are in relation to the urethra; but if you ignore the presence of the fistulous opening and cut down through it straight into the urethra, all temptation is avoided and you can complete your operation from within outwards with perfect ease and certainty. Of course, the removal of all infiltrated tissue must be as complete as in the case of roof fistula, and the wound must be left equally wide open.

In those cases where the stricture holds out any prospect of cure this may be undertaken during the after-treatment of the fistula, that is, the stricture should be dilated as far as possible whilst the patient is still under chloroform for his operation and the dilatation kept up, or, if possible, increased, by the subsequent daily passage of metal sounds during the whole time of the healing of the wound and at longer and gradually increasing intervals afterwards.

A much more seldom met with form of urinary fistula is fistula connected immediately with the bladder, resulting from a penetration of the bladder disease through its muscular coat, causing adhesions between bladder and belly wall, and finally perforation and the formation of a fistula situated either between pubis and umbilicus or in one of the groins. These fistulæ only occur in most extreme cases of the disease, when the whole bladder is disorganised and its cavity filled with bilharzial growth which prevents the escape of the urine by the urethra, and I believe they are altogether incurable. I have only had a few of these cases, some four or five, and in spite of wide excisions, even combined with suture, and a perineal opening, I have never managed to cure any of them. It may seem rather a rash and desperate proceeding to inflict such serious wounds as are implied in the description of these operations for fistula upon patients who are in a debilitated state from the presence of advanced bilharzial disease; but whether it is that they have acquired a habit of resistance from the sufferings they have borne so long, or whether their release from the worst of these sufferings improves their physical tone, there cuperative powers they exhibit after these mutilations are most surprising, and although I have removed large masses of tissue and inflicted cavernous wounds, I am happy to say I have never lost a case as a direct result of operation for urinary fistula.

The treatment of bilharzia of the vagina is, I am sorry to say, judging from the few cases I have been privileged to treat, at present most unsatisfactory, and the futility of such methods as douching and disinfecting and the application of all sorts of possible medicaments on this easily getable mucous membrane only serves to indicate how little influence our necessarily more feeble efforts can have on the mucous membrane of the bladder when affected with the same disease. The only proceeding holding out a prospect of cure is excision of the thickened and infiltrated mucous membrane, and this, of course, can only be done where the disease is limited in extent. If the cases presented themselves in a sufficiently early stage, with the disease limited, as I believe it generally is in its early stages, to the posterior wall of the vagina, the operation would be simple, and probably, for the time being at any rate, effectual; but although I have done excision of a large extent of mucous membrane in two of my cases I was not altogether satisfied with the result, although the patients expressed themselves as benefited, and I think they were so to a certain extent.

The treatment of bilharzia of the rectum in its early stages consists in allaying the irritation of the part, and lessoning as far as respite, the hyperspire and

and lessening, as far as possible, the hyperæmia and secretion of mucus. This can best be done by local

sedative and astringent applications, as enemata of starch and opium, or of solution of sulphate of copper, and undoubtedly much relief is given to the patients by this treatment; but the disease tends to advance in spite of anything we can do at present, and when it has arrived at the stage of formation of polypi its treatment is even more unsatisfactory than that of bilharzia of the vagina, for here, although it would seem to be a very simple thing to remove the polypi by excision or ligature, or even to excise the affected part of the gut, yet in practice it will almost invariably be found that the disease extends so far up the intestine that it is impossible to go high enough up to get to the healthy mucous membrane; any attempt at systematic ligaturing and removing by scissors, for instance, leading one on and on until the ligature can no longer be tied owing to the distance from the surface, the growths not even diminishing in number or size, but rather increasing, the higher one goes. In cases without prolapse, a certain amount of relief may be given temporarily by thoroughly stretching the sphincters, and at the same time removing any especially large polypi, but the relief is only quite temporary, and although the patient obtains a respite he invariably returns to his former condition. Latterly, I have been trying the effect of stretching or incising the sphincter, and then swabbing the gut out as high as I can reach with a pledged of cotton, wool held in a forceps, and soaked in a 1 in 10 solution of chloride of zinc, allowing the solution to remain in contact with the tissues for about one minute, then drying out the excess with dry cotton pledgets, and finally flushing out the gut with copious enemata of saline solution. This is followed by no enemata of saline solution. unpleasant results, indeed the patients express themselves as being relieved; but I have not as yet done enough cases, or been able to follow them up long enough, to determine as to whether they have received any permanent benefit. In cases with prolapse due to bilharzia, it is rather difficult to decide whether excision of the prolapsed portion is justifiable or not. Of course, if the relief were likely to be permanent there would be no question as to the advisability of the operation in suitable cases, but the same reasons that make removal of polypi ineffectual renders the result of any operations for prolapse also uncertain. In some cases lineal cautery, with destruction of multiple areas of the whole mucous membrane, seems for a time to prevent the descent of the bowel, and in the majority of cases admitting of any form of operative treatment perhaps this is the best course to pursue, always remembering that great after-care is necessary to remove the sloughs which are cast off and to keep the rectum clear. This is best done by enemata of olive oil twice daily for the first three or four days after operation, and then by enemata of boracic acid solution twice daily until all the sloughs have come away. In cases still more favourable than these, and there are a certain number in which prolapse occurs fairly early in the disease, and when the patient's health is by no means broken, I think excision of the prolapse is not only justifiable but called for. These are, as a rule, cases of fairly well-nourished men whose forcible and continuous efforts at expulsion of the irritation felt in the rectum have caused a prolapse,

as it were, more traumatic in nature than the majority of cases, and when the suffering is more acute and the prolapse with difficulty reduced, owing to the amount of contractile force still remaining to the sphincter. These cases, I think, can be relieved for a comparatively long time by the operation of excision, and in them I have done it with some success, although, unfortunately, the cases have been few. The important things to remember in operating on these cases are two: first of all the absolute necessity of preserving both sphincters intact, and secondly, to divide the gut as high up as possible. My method of operating is as follows: Having the patient under chloroform and in the lithotomy position, I pull the prolapse down as far as it will come and attach two pairs of artery forceps to its apex when protruded, one in the middle line in front and the other in the middle line behind; I then search for the upper edge of the internal sphincter, or if this is impossible to find owing to the thickening of the mucous membrane, I allow for its breadth about an inch and a half above the junction of the mucous membrane and skin, and cut through the gut at this point in the middle line anteriorly: in some of these cases it would seem that the peritoneum comes lower down than normal, for in about half the cases operated upon the peritoneal cavity has been opened by this incision and this very much simplifies the operation; if the peritoneum be not immediately opened a way must be made either with the finger or with the handle of the knife through the connective tissue between the rectum and bladder until the peritoneum is reached and opened. Having opened the peritoneum the incision begun in front at the edge of the internal sphincter is carried round the circumference of the bowel, the edge of the sphincter being picked up at intervals of about an inch with artery forceps, in order to keep it under control. The incision, starting from in front, very soon leaves the peritoneum, as this does not come nearly so far down on the rectum behind, but the limits of the gut are very easily defined and the division presents no difficulty. The lower end of the intestine having been freed the prolapse is pulled down as far as it will come without exerting too great force and the gut is again cut through in front and the upper cut edge is caught with forceps. A silk-worm gut stitch is then passed from the inside of the upper gut through all its thickness, made to traverse the peritoneal cavity and passed through the sphincter from its peritoneal side into the lumen of the bowel and clamped in position with forceps. The incision in the upper end of the gut is then continued round its circumference, the edge being clamped and a stitch being introduced at about every inch as it is cut. When the circuit is complete the upper end of the intestine will be completely controlled by the forceps clamped on it and all the sutures will be in place. All the vessels which have been divided and clamped during the double division of the bowel and which are somewhat numerous behind are now secured by ligatures, and nothing is left at the seat of operation but a double row of clamping forceps and the sutures in place, the upper end of the gut being prevented from escaping upwards into the peritoneal cavity by its attached forceps. Some bleeding points will be found in the mucous membrane itself and

which are difficult to secure, as the thickened tissues break away on being caught with forceps, but these do not matter, as all hæmorrhage from them will be stopped by the sutures when they come to be tied. All that remains to be done now is to tie off the sutures, and this is done beginning from the middle line in front and tying them in order, one on each side of the gut, until the circuit is complete, the nearest forceps being removed as each stitch is tied. The sutures are kept long until the whole of them are tied in order, that they may take the place of the forceps in maintaining the control of the gut. When the sutures are all tied the wound is gone carefully over again, and any accessory suturing that may be necessary to accurately approximate the divided edges of the gut is done; and finally, when all is quite secure, the sutures are all cut short. As soon as the sutures are cut the gut shoots back into the abdomen by its own contraction, this being brought about by the intestine having been forcibly brought down and divided about the true line of protrusion, and with it carries part of the anus, including the internal sphincter, this muscle being drawn back into its natural position. The part is left altogether undisturbed, and after about eight or ten days the sutures which have not cut their own way out should be removed, and this will be found a matter of some difficulty, owing to the amount of contraction which the sphincter will be found to have regained. The operation is one of some severity, and should only be undertaken in favourable cases, but in those cases when it can be fully carried out the result will be found most satisfactory, this good result depending upon the fact that the sphincters are not interfered with, and that they are therefore in a condition to regain their functions.

In cases of bilharzial infiltration occurring in the skin, the treatment simply consists either in complete excision or a thorough destruction, by scraping of the whole of the granulation tissue, followed by the simplest form of antiseptic dressing; and although the cicatrisation of the wound may be tedious owing to its extent, the cure will in the end be complete.

Bilharzial affections of other organs have not yet come into the range of practical surgery, although we may hope in the future to extend our operations as far and as fast as our knowledge of the different forms of the disease increases; for I am sure that as we search more carefully and closely for extensions of the disease, such extensions, at present unsuspected, will be found; but however widely we extend our search and our treatment the disease will never be capable of true cure until we find some method of attacking the parent worms in their at present inaccessible habitation, and I sincerely trust that this signal service to the Egyptian race may be achieved by a native Egyptian surgeon educated at Kasr-el-

# MYIASIS — THE LUCILIA MACELLARIA — THE SCREW WORM.

By John W. Lindsay, M.A., M.B., Ch.B. (Aberd.) Villa Concepcion, Paraguay, South America.

Cases of Myiasis are very common in this country. The screw-worm (Lucilia macellaria) is found embedded in the skin in all conceivable situations, in the legs, arms, chest, back, face, and scalp.

It is very seldom that all the animals about a farm are perfectly free from this pest; hence it is that the patients who come for treatment are generally of the farming class. Many of these have no adequate means of treating themselves, and it sometimes happens that very bad sores result. Unless one is familiar with the condition, mistakes in diagnosis are

apt to be made.

In one case of a small tumour of the scalp I could detect no opening or sinus, and considered it a sebaceous cyst. Later, when it came to be treated, it was found to contain a screw-worm. A lady had one in her upper arm. She had felt no symptoms to call her attention to the part until one day she noticed the swelling, and to her alarm saw protruding from the opening at the apex of the tumour the head of the larva. She used to sit and watch it, and her remarks were most amusing. "Oh, the horrid looking beast! he's gone again! I go to catch him, and just when I think I have him he disappears"!

A boy of 16 consulted me in regard to a swelling in his right eyelid. He had felt the first symptoms about three weeks before. On waking one morning he felt a slight itching of the margin of the eyelid, and noticed a slight localised swelling. Since then it had increased in size until now it was as large as a hazel nut. The patient stated that it had burst several times, and that

a dirty-looking bloody discharge had escaped.

At times he suffered excruciating pain, and for several nights before he consulted me he had got no sleep. As I had no means of treatment with me and no antiseptics, I merely gave the swelling a very superficial examination, and diagnosing it as a Meibomian cyst arranged to operate the following day. I washed out the eye with weak sublimate lotion; the result was rather disconcerting. The patient drew himself together, and groaned with pain.

I hastily introduced some solution of cocaine. The effect this time was rather surprising, for from a small sinus just above the line of and slightly hid by the eyelashes there shot out the head of a maggot!

On everting the lid I found that the larva had burst through the palpebral conjunctiva, and was lying up

against the fornix and bulb.

When removed it was found to be fully threequarters of an inch long, and about three-eighths of an inch in diameter at its thickest part. It had the typical slightly irregular rings or segments, armed with minute dark-brown horny spines. This explained the attacks of severe pain from which the patient suffered, for every time the larva moved or was disturbed it must have caused great irritation of the conjunctiva.

I touched the sinus or opening with pure carbolic,

and applied a simple bandage and dressing.

Three days later the eyelid looked almost normal.

The boy stated that once before he had had one in the skin of his chest. He had noticed them in the dogs and other animals about his home.

The local remedies for "ura," as it is called, are tobacco ash or juice, or kerosene. The presence of the abraded surface caused by the larva is frequently the predisposing cause of what is locally known as "espasmodura," a kind of diffuse cellulitis, usually of the lower extremities.

# HARROGATE AS A HEALTH RESORT FOR TROPICAL INVALIDS.

By P. A. NIGHTINGALE, M.D., Edin. Formerly of Bangkok, Siam.

THE number of persons who have resided any length of time in the tropics and who have not suffered from some ailment incidental to the climate is but small, while the majority of those who have escaped, on returning to a temperate zone soon feel that they are not "quite up to the mark," and wisely seek advice as to what they should do, and where they should do it.

In these latter an examination quickly shows either that they are anæmic, or that their livers have had too much work thrown on them, the skin no longer being bathed in the perspiration it has been accustomed to for years, or that their spleens are a little enlarged, or their digestive organs cannot assimilate the home food to which they have been so long

strangers.

It is borne in on them that life in London, or any other large town, with its round of gaieties and dinners, want of regular exercise and air deficient in ozone, but makes them worse, and they see before them a chance of having to go on the sick list and all enjoyment of their well-earned holiday lost.

A visit to one of the South Coast seaside watering places is tried, usually on account of its mildness, but found wanting—for to the tropically-anæmic person it brings neither sound sleep, healthy appetite, nor removal of that muscular slackness of which he

complains so much.

The secret of his troubles lies in the fact, which practical experience alone teaches, that the tropical resident requires bracing hill air to invigorate and refresh him, and that without it he will not derive the full benefit of his trip home.

To such a person Harrogate is the ideal resort during the summer months, and a stay of a few weeks

in it will give him a new lease of life.

Situated some 400 feet above sea-level, on the highest table-land between the Irish and North Seas, and almost equi-distant between the two, its air well charged with oxygen and ozone, Harrogate (in the West Riding of Yorkshire) during the last few years, has become one of the best known and most patronised inland watering-places of the kingdom.

Mr. Paul, Borough Meteorologist, has recorded the following observations during the year 1901:—

Month.			Mean Temp. of Month.		Mean Relative Humidity of Air.		Rainfall.	
May				50.2	73 p	er cent.	0.78 ins.	
June				55.2	68	11	1.48 ,,	
July				63.4	79	,,	1.44 ,,	
August				59.5	80	,,	1.38 ,,	
September				55.0	85	,,	1.00 ,,	
October				47.4	91	,,	1.89 ,,	

The rainfall for the whole year was 24.36 ins., and the average during the previous eighteen years was

The mean reading of the barometer at sea-level and zero was 29.897, and the average mean for eight years was 29.902.

The amount of sunshine recorded was 2171 hours 34 minutes, while the death-rate during the last seven

years averaged 12.3 per 1000.

The town is built on a series of gently-undulating slopes prettily laid out in gardens, admitting of the graduated exercise in the Nauheim treatment of cardiac disease being carried out to perfection.

The baths and waters are, however, the main attraction of Harrogate, and few places have been so favoured by Nature and a wise administration as this fashion-

able resort.

The waters naturally divide themselves into two main classes-the sulphur, in the form of sodium sulphide, and the chalybeate, in the form of ferrous carbonate. Thus we have the strong and mild sulphur, the saline chalybeate and the pure chalybeate springs in numerous varieties and strengths.

The well-known action of sulphur in liver and other affections need not be touched upon here, but the Harrogate waters also contain an appreciable amount of the sulphate or carbonate of barium which, as a cardiac stimulant, is a valuable adjunct, especially when the waters are taken for their alterative action.

Among the saline chalybeate group, one especially, the Kissingen Spa (so called from its close resemblance to the Kakoczy spring of Kissingen, in Bavaria) deserves mention, for its great value in the treatment of anæmia and chlorosis.

Harrogate now boasts of the finest collection of baths in Europe, there being over thirty different kinds of baths, douches, and massage; among these must be mentioned the d'Arsonval high-frequency electric currents; the Dowsing radiant heat and light treatment; the Greville hot-air treatment; the carbonic acid bath (Nauheim); the liver pack and the electric sulphur bath. The Aix-la-Chapelle inunction methods for syphilities are also carried out with great success by skilled attendants, while dry and wet massage in every form is made a speciality of. Thus the tropical invalid will find waters and baths of every variety to suit his ailment, while the fine bracing air, inducements for outdoor exercise, and general gaiety during the season, will complete the 'cure" of those who only need a general bracing up of the nervous and muscular systems.

Finally, it should be noted that after the end of October Harrogate is rather too cold for the tropical resident, who might then, with benefit, go to a more

southern watering-place, such as Bath.

### OBSERVATIONS ON PLAGUE.

By Professor C. Terni.

Of the Bacteriological Institute of Messina, Italy.

The diagnosis of plague presents very considerable difficulties, especially during the initial outbreak of the disease. This is not due to ignorance nor to any wish to conceal the disease, but is owing to the want of positive clinical and pathological features at the early stages of the outbreak. In consequence of this uncertainty such terms as lymphatitis, pernicious lymphatitis, malarial lymphatitis, &c., are bestowed upon these cases, thereby causing, not infrequently, serious consequences, owing to initial cases of plague remaining undiagnosed and becoming diffused foci of infection.

MILD CASES OF PLAGUE.

In every country in which plague has recently appeared benign cases of the disease have been described; some of these cases end in spontaneous cure, inducing many observers to attempt to establish differences between the mild and the severe forms of plague, which occur after the outbreak has lasted some time.

In Egypt, for example, long discussions took place on this subject, and the initial cases of mild plague were diagnosed as lymphatitis, or lymphadenitis, and it was stated that such acute affections were common every year during the hot weather, and especially during the fall of the Nile. In India, at Oporto, and especially in Brazil, the same opinions prevailed, and in all these countries it was subsequently demonstrated that the so-called cases of climatic adentitis

were really cases of true plague.

It is easy to understand the importance of obtaining some ready means of diagnosing between plague and ailments which, whilst simulating it in many respects, may, or may not, belong to the same etiological factor. So long as there is any confusion between plague and allied disorders there is a great danger that the earliest cases of the disease escape detection, and all subsequent attempts at stamping it out are rendered much more difficult, or altogether impossible. Having had the opportunity of studying over 1,000 cases of plague, mostly at the Paula Candido Hospital, in Rio-de-Janeiro, I propose to recount some of the characteristic features of the disease and of the differential characteristics of the disease.

### DIFFERENTIAL DIAGNOSIS BETWEEN LYMPHATITIS AND BUBONIC PLAGUE.

The initial cases of plague are almost invariably bubonic in character, and it is only when the disease has lasted some time and the plague bacilli have acquired a marked degree of virulence that gastrointestinal, septicæmic or pneumonic forms appear.

Brazilian physicians have investigated closely socalled pernicious and malarial "lymphatitis" under which appellation they classed together all cases of adenitis and lymphangitis which ran a rapidly infecting course. These, however, for the most part present the usual symptoms of phlegmon in temperate

climates.

The affection usually commences with a phlyctene, papule or cutaneous inflammation, the result of slight injury or the bite of an insect. At the seat of infection a slight necrosis or eschar forms, similar to a malignant ulceration (carbuncle) with livid margins, followed by hyperæmia and ædema of adjacent Subsequently lymphangitis and adenitis supervene, accompanied by polyadenitis. Fever with rigors suggest a malarial type, but quite unjustifiably, and as Rho remarks, inflammatory and phlegmonous complications, in persons rendered anæmic and depressed by long residence in a hot climate, are likely to arise without finding malaria as a determining cause. In all the cases I examined I found septicæmia, due to the presence of streptococcus pyogenes, in the blood; very occasionally staphylococci were met with and in two cases diplococci; the presence of these cocci excluded the possibility of the ailment being due to malaria.

In tropical countries other affections, such as carbuncles and malignant ædema, give rise to lymphangitis and adenitis, but modern methods of investigation

differentiate these nowadays.

In plague, the term lymphatitis, which is meant to include lymphangitis and adenitis, does not apply, as inflammatory tracts along the lymphatics is not the rule. In bubonic plague the process of diffusion is only shown by tumefaction in and around a gland at some distance from the primitive focus of inoculation. The process of diffusion is only shown by the successive tumefaction of lymphatic glands in parts more and more distant from the original focus of infection, and each swollen gland seems independent of its neighbour. If for instance the initial bubo is crural, in the course of two or three days and even less, inguinal buboes make their appearance, but they remain for many days perfectly distinct from each other, nor is any connecting inflammatory tract between these glands apparent.

### THE BUBO THE ORIGINAL LESION.

In the great majority of cases the occurrence of a plague bubo is not preceded by any previous cutaneous injury that would serve to indicate the spot of penetration of the germs through the skin. sionally a trifling papule or phlyctene is found located as a rule on the antero-external aspect of the legs or on the dorsum of the foot. Still more rarely is a furuncle or ulceration seen, but whatever local lesion may be met with no intermediate alteration in the skin, lymphatics and veins, are to be observed. It is true that a lymphangitis has been described, but it occurs only when open sores have existed for some time, and when in the discharge pyogenic germs - staphylococci and streptococci - have developed. Plague lymphangitis is therefore always secondary, and when it appears it is quite late in the disease. Adenitis from tuberculosis, syphilis, &c., have distinctive characteristics which differentiate them at once from plague buboes, and with the exception of simple acute adenitis ending in abscess, and adenitis due to local venereal infection, there is not likely to be much confusion.

In connection with these two infections the nature of the bubo, the local pain, the temperature, the symptoms of general infection, must be taken into consideration. In all other acute inflammations of lymphatic glands local swelling and pain precedes the fever, but in plague the fever, as a rule, precedes the local pain and the formation of the bubo. In plague we find violent headache, a temperature of 39° to 40° C., local lancinating pain becoming more and more acute, whilst as yet local glandular swelling is in abeyance. This prodromal period usually continues for twenty-four hours. The glandular swelling, when it appears, increases in size, until by the fourth or fifth day of the disease it attains the dimensions of a hen's egg; for a short time it remains stationary, being painful, hard and isolated from the surrounding tissues. There is no fluctuation, nor is the skin red or hot.

On the second and third day of the illness, whilst the bubo is increasing in size, symptoms of blood poisoning develop with stupor, delirium, &c. tongue is coated, presenting livid red edges, the breath is fœtid, and the conjunctiva hyperæmic. Should a favourable issue result, delirium and tachycardiac symptoms in many cases continue after the temperature has been normal for nine days. The explanation of this phenomena is to be found in the fact that through the direct action of the leucocyte, the infective process is stopped owing to the destruction of plague bacilli; there however remains in the initial bubo a quantity of toxic products, which cannot be easily eliminated, and by finding their way in the blood continue to infect the system. In weak persons, the slow action of the toxin existing in the bubo may set up plague cachexia with fatal termination, if a rational cure is not adopted by timely incision of the bubo.

Positive Signs and Symptoms of Plague.

The signs and symptoms of bubonic fever are of so destructive a character as to admit of no confusion between acute adenitis, even when the bubo is cervical. The characteristic features are as follows:—

(1) Fever with lancinating pain and some slight engorgement of a lymphatic gland in the groin, the

axilla or the neck.

(2) Progressive and rapid tumefaction of the lymphatic gland or glands in these neighbourhoods; each gland forms a separate enlargement, and is hard and painful, well defined in outline, moveable on the deeper tissues, and under the skin, which has no share in the inflammatory process.

(3) Grave symptoms of general blood poisoning, out

of proportion to the local lesion.

(4) In plague buboes no suppuration takes place

during the period of infection.

Only after the crisis of the illness has passed, and when convalescence obtains, does softening of the glandular swelling take place, and spontaneous necrosis of the skin. As a general rule, however, the glandular enlargement disappears very gradually, and without suppuration. In very exceptional cases, owing to the infection of the swelling by germs other than plague bacilli, local symptoms may resemble simple adenitis, but in true plague the glandular swellings are much larger in bulk and in number, and the general symptoms are much more severe. Taking all these facts into consideration, a clinical diagnosis of bubonic

plague may be fairly positively arrived at, at any rate with sufficient certainty to justify steps being taken to deal with the case, and with suspects and outcasts, without waiting for further confirmation. In all cases, however, it is necessary to test the initial cases in any outbreak, bacteriologically and microscopically before pronouncing definitely upon the disease.

# SEPTICEMIC PLAGUE AND GASTRO-INTESTINAL CATARRH DUE TO PLAGUE.

As a rule cases of plague septicæmia and pneumonia appear only when cases of bubonic plague have already occurred, and the practitioner's attention is directed to the possibility of their ailments being due to plague infection chiefly by the gravity and severity of the signs and symptoms. Primary plague septicæmia is uncommonly rare and my experience leads me to affirm that it does not exist. Septicæmia in plague is always preceded by either gastro-intestinal catarrh or by a bubo, however small and imperceptible that bubo may be.

Septicæmic cases of plague are more apt to occur when the initial bubo is situated either on the neck or in the axilla; this is due no doubt to the more immediate continuity of these regions with the deep lymphatics in the thoracic mediastina, facilitating thereby a rapid

diffusion of the bacilli or either organisms.

My experience teaches me that, even in the gravest cases of the septicæmic forms with a rapid course and before the appearance of the specific bacilli in the blood, a more or less evident tumefaction of some lymphatic gland accompanied by lancinating pain will be found. At autopsies of persons dead of septiæmic plague hypertrophied and hæmorrhagic axillary cervical glands infiltrated with plague bacilli are always found. These glandular enlargements cannot be admitted to be secondary to a general infection because they are commonly in limited numbers and in precise regions. It is therefore evident that from a pathogenic and clinical point of view, no distinction can be made between bubonic and septicæmic plague; the latter is only an acute and late stage of the former.

### (To be continued.)

AT a meeting of the Dermatological Society of Great Britain and Ireland, held on Thursday, April 24th, 1902, Mr. George Pernet showed some microscopical sections of Yaws (Paranghi of Ceylon). He was indebted to Sir William Kynsey for the original material. The sections were from a formed yaw. By Pappenheim's method the characteristic plasma-cells of granulomata in the corium were well brought out. There were also numerous leucocytes, which also invaded the rete of the epidermis. As to the latter, the basal layer showed pigmentation, as the yaw was obtained from natives of Ceylon. This pigmentation was best seen at the edges of the preparations. There was downgrowth of the epidermis, here and there cutting off portions of corium. There was also marked parakeratosis, the horny layers being here and there separated. The appearances differed in some respects from what is observed in syphilis and other granulomata.

TREATMENT OF LEPROSY BY INJECTIONS OF CHAULmoogra OIL.—In 1894 a leper was given 128 hypodermic injections of chaulmoogra oil during seven months; by the treatment the function of the sweat glands, which had been wholly lost, was restored. In 1896 the same man was treated by 106 injections of the same oil; the normal colour of the skin reappeared, and the fingers could be straightened. In 1897 injections to the number of 87 were administered; 50 injections were given in 1893, and 33 in 1899. During the whole period of treatment 90 ounces of oil were administered. At the end of the treatment, with the exception of a single nodule over the ulna, no trace of leprosy was left.—Rev. de Therapeut.

A CLINICAL NOTE CONCERNING TROPICAL HEAT-By Dr. Salvatore Micela.—Observations on the clinical aspects of heat-stroke as it occurred in Italian soldiers in Africa. The symptoms observed were a sudden sense of oppression in the region of the heart, or of a constriction in the epigastrium; a very high temperature, a dry, hot skin, a weak rapid compressible pulse, a weak or absent apex beat, somnolence or coma, a pale face with semi-dilated pupils showing a slow reflex to light. In some soldiers there occurred bilious vomiting, trismus, convulsions, hallucinations, and delirium. The patients were all stripped and surrounded with ice, especially on the chest and the back along the vertebral column, and in addition received injections of caffeine. During a night march across a hot and sandy plain such cases were not observed, while in other marches under the burning sun, sunstroke occurred in a large number of soldiers. The hyperpyrexia came on insidiously, and seized the patient suddenly. The soldier, if not seen in time, strayed behind his comrades and fell on the ground, in some cases dead. In speaking of the pathological mechanism of this accident, the author sums up by saying that the excessive heat of the body paralyses the heart and the sensorium. Physiology teaches us that in mammals the heart beats cease when the body temperature reaches 44.5° C. It is possible, however, that the tropical region in which these heat strokes occurred was particularly favourable to such accidents on account of the great amount of decomposing vegetation capable of producing toxines that would be inhaled by the soldiers, or it is possible that the malarial parasite may have something to do with the intoxication of sunstroke. The author distinguishes heatstroke from sunstroke, and says that these conditions are frequently confused. Sunstroke occurs, even during repose, as the result of the direct action of the rays of the sun upon the head and neck. It consists in a congestion of the cerebral centres, and is accompanied by asphyxia and not by any increase in the temperature. On the other hand, heat-stroke occurs when there is added to the exposure to heat an excessive amount of muscular activity. It consists chiefly in a toxemia which results from the disturbance of the compensating mechanism of heat regulation, and is accompanied by cardiac distress, a rise of temperature, and a lack of secretion of sweat. Gazetta Degli Ospedali e Delle Cliniche, March 16th,

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THE

# Journal of Tropical Medicine

July 15, 1902.

# HOW TO DEAL WITH THE OPIUM QUESTION IN CHINA—A SUGGESTION.

THE letter from Dr. James L. Maxwell in connection with the export of opium from India to China which is published in our issue of July 1st is well timed. The letter was a reply to statements contained in a leading article on the subject which appeared in this Journal on June 2nd.

It is a pity to see such high contending parties as the governments of Great Britain and of India on the one hand, and a section of the medical profession on the other, accusing each other of mis-statements, inaccuracies, and deliberate shuffling of responsibility. It is not so very long ago that one section of medical men stamped the work of the commission on opium, before which many medical men in India and China gave evidence, as "prejudiced garbage." We are afraid

no good can come of this line of argument. We are quite conversant with the evils of opium consumption in China, and whilst deploring the consequence, we are also ready and willing, as far as lies in our power, to assist in the campaign against the exportation, in quantity, of Indian opium to China and elsewhere. There is, however, a dignified method of conducting such a campaign, and one which from a rational standpoint will commend itself to every one.

The facts are these: Opium is being exported from India to China; the Chinese employ opium for the purpose of opium-smoking; the consumption of opium is detrimental to the physical and moral welfare of the Chinese; the Chinese wish to impose a duty on opium imported from India so as to lessen the evils arising from the consumption of the drug in China; the imposition of this duty is prevented by Foreign Governments. That is really the case as it stands, and if widespread support is to be enlisted, let the endeavour be to allow the Chinese to impose what tax on opium they please, seeing that such a step is necessary for the welfare of their country. Leave the guiltiness of the governments of Great Britain and India and the process of vituperation which has prevailed out of the question. The battle has not been won, nor is there any prospect of winning it, on the lines of recrimination. Were the question of the freedom of the Chinese to tax an imported article which is working destruction amongst them, brought forward by itself, there would be but few who would not assist to get the freedom granted.

In this way only permanent good might ensue, for as sure as India ceases its exportation other foreign nations will supply the Chinese markets. Little or no good will be done to China by proving that British ministers and authorities are guilty of breaking their promises. The whole question ought to resolve itself into what is to be done to save the Chinese from the deleterious influences of opium smoking, and the method which will attain that end is the one deserving of support. Will some of our readers frame a resolution embodying the proposition "that the Chinese be allowed to impose what tax they

please on imported opium." If this is done the well wishers of China-and they are many-will support the scheme heartily, and we will, if desired, circulate the resolution for signature amongst the widely scattered readers and subscribers of this Journal so as to obtain their signatures and those of their friends. A resolution of this kind backed by the signatures of responsible men and women would carry weight, and should be submitted not only to the Government of this country but to every Government in Europe and America.

J. C.

### Translations.

A CONTRIBUTION TO OUR KNOWLEDGE OF PATHOLOGICAL ANATOMY PERNICIOUS SWAMP FEVERS (MORE ES-PECIALLY AS REGARDS THE CHANGES IN THE PIA MATER).

> By Dr. A. PEWNITZKY, Military Surgeon, St. Petersburg. (Translated from the Russian.)

DR. A. PEWNITZKY has written a comprehensive monograph on the above subject, the result of his studies and observations in the bacteriological laboratory of the hospital for nervous and mental disorders attached to the Imperial Academy for Military Medicine, St. Petersburg.

The conclusions arrived at by the author, are as

follows :-

(1) The pernicious attacks of swamp fever are particularly serious cases of malarial disease which are almost exclusively originated by the tropical tertian parasites.

(2) The severe course of the disease is caused by the remarkably luxuriant growth of this parasite in the organism, induced by conditions which are still

unknown.

(3) The pernicious form of swamp fever runs a typical course, and, like the æstivo-autumnal fevers it commences in the middle of June and continues to

October or November.

(4) This course of the disease depends on the circumstance that in malarial regions with hot summers the mean temperature of the day rises to from 25° C. to 27° C., this heat favouring the development of the tertian parasite in the stomach of Anopheles.

(5) Persons coming from fever-stricken districts between July and October and who are taken seriously ill, should be regarded as likely to have acquired pernicious swamp-fever, and an examination of the blood by an experienced medical man should immedi-

ately be undertaken.

(6) The study of the question of the clinical varieties of pernicious swamp fever, in conjunction with the increase of our knowledge as to the excitants of many infectious diseases, reveals that some of these varieties are of complicated origin as has been proved to be the case in the presence simultaneously of malaria and typhoid, malaria and cholera, malaria and

croupous pneumonia.

(7) In the malignant forms of swamp fever the endothelium of the vascular walls are primarily affected by the effects of a toxin the nature of which is still unknown; the red corpuscles which harbour the sporozoa then find considerable resistance to their passage through the diseased capillaries, and severe circulatory disturbances are thus originated. These two conditions cause disorder of nutrition of the parenchymatous elements of all the important organs: such as the brain, the myocardium, the liver,

spleen and kidneys.

(8) The changes in the cerebrum and cerebellum in the malignant forms of swamp fever are severe hyperæmia of the vessels of the pia mater, ædema, dilatation of the subarachnoid perivascular and pericellular spaces, engorgement of the capillaries (the endothelium of which is swollen) with a mass of disintegrated red blood corpuscles, which, in consequence of their increased circumference and diminished elasticity, traverse the capillaries slowly, and occasionally completely engorge them. This circulatory disturbance causes a number of punctiform hæmorrhages in the grey cerebral matter and at the junction of the grey with the white matter of the brain; it also causes various stages of degenerative and necrotic processes in the nerve-cells.

(9) In the pernicious forms of swamp fever phagocytosis is distinctly visible in the capillaries of the entire nervous system, and quite particularly in the spleen, bone, marrow and liver; the blood of the

hepatic vein is, however, free from parasites.

(10) Besides the large mononuclear leucocytes, the cells of the adenoid tissue in the spleen, the lymphatic glands, and in the bone-marrow exhibit increased phagocytic activity, as does also the endothelium of the blood-vessels. This activity is not brought into the blood-vessels. This activity is not brought into play simultaneously, but develops energetically, sometimes in one direction, sometimes in another.

(11) The abundant development of the parasite in pernicious swamp fever is responsible for the fact that all the sporozoa are in the same stage of development simultaneously, and if it happens that the phase is the intra-corpuscular one in which quinine is ineffective, it is easily understood why the quinine treatment of such patients does not always save them. On this account a method of treatment must be adopted that is calculated to expel the toxin from the organism. For this purpose the subcutaneous injection of physiological solution of common salt may be employed, and quinine may be given in addition, as in this form it is quickly absorbed.

(12) As the cardiac muscle is seriously affected in the malignant forms of swamp fever, the use besides quinine of a sufficiency of cardiac stimulants such as caffeine is indicated in addition to the physiological

solution of salt.

# THE CLAYTON PROCESS OF DISINFECTING SHIPS.

The Glasgow steamer "City of Perth," left Calcutta on May 4th, 1902, with a mixed cargo for Dunkirk, France. Shortly after leaving Malta, dead rats were discovered in a storeroom, and were handled by the steward and one of his assistants, both of whom contracted plague and succumbed to the disease.

The steamer was put in quarantine at Dunkirk and kept there over ten days, the French Sanitary Authorities at that port being quite unable to deal with the vessel. The owners were informed that the steamer would have to proceed to the Quarantine Station at St. Nazaire, and there discharge the cargo into lighters, and be subjected to eleven days quarantine afterwards. The owners were naturally very unwilling to incur this enormous expense and delay, and after considerable negotiation, permission was obtained from the authorities to bring the steamer to the Thames, to be disinfected, with her cargo on board, by the Clayton Company, who have a fumigating barge in London for this purpose. On the steamer arriving in the Thames, and after the cabins, &c., had been disinfected by the Port Sanitary Authority, "Clayton gas" was pumped into every part of the vessel where plague rats might be lurking. By this operation it will almost certainly be found that all rats on board, as well as the fleas, &c., with which they are infested, and which are the recognised conveyors of plague from rats to human beings, have been destroyed. The plague microbe itself succumbs to about three hours' exposure to the "Clayton gas," and every part of the vessel was subjected to the treatment for a considerably longer period, so that all danger of the disease spreading is averted. The cargo was subsequently discharged into lighters, and all dead rats discovered were cremated in the ship's furnaces. In a recent vessel disinfected by the Clayton process, some 1,500 dead rats were discovered after the operation.

### Obitnary.

### MAXIMILIAN FRANK SIMON, C.M.G., M.D.

The death of Dr. M. F. Simon removes from amongst us a distinguished officer of the Colonial Medical Service. His work in Singapore, where he spent the greater part of his professional career, was characterised by a thoroughness and conscientious devotion to duty, which no doubt hastened his end. For many years Dr. Simon held the important and responsible position of Principal Medical Officer of the Straits Settlement, during which period he initiated and developed many well-timed and radical improvements in the medical service of that important district. On his retirement from the service he had the honour of receiving a C.M.G., a well-earned distinction, but one which he was destined to enjoy for all too short a time.

It will be remembered, by those who were present at the meeting of the British Medical Association at Cheltenham, in 1901, that Dr. Simon was Secretary to the Section of Tropical Diseases, where he not only carried out the secretarial duties in an efficient manner, but contributed largely, from the wide store of his experience, to the scientific and professional success of the meeting.

For the approaching meeting of the Association in Manchester Dr. Simon was nominated as one of the vice-presidents, and it is needless to say that the Section of Tropical Diseases will be deprived of one of its most eminent supporters. As marking the thoroughness of Dr. Simon's professional work, it may be mentioned that he took out, in addition to his medical and surgical degrees and qualifications, the diploma of Dental Surgeon, feeling that, without a practical knowledge of dentistry, he could not adequately fulfil the duties of his position, in a colony where professional dentistry was at the time unknown. Of a gentle and retiring disposition his loss is keenly mourned by those who knew him intimately. Dr. Simon's writings on beri-beri, cholera and plague, stamp his professional knowledge and powers of investigation as having been of a high order; and these, together with his administrative abilities, obtained for him the honourable position which he occupied in the Colonial Medical Service.

# Current Literature.

### QUININE AND ITS SUBSTITUTES.

Substitutes for quinine are being assiduously sought for, with but doubtful success. In the  $Centralbl.\ f.$ innere Med., 1901, the subject is discussed under the heading of "Quinine and its Esters," and several productions which are intended to obviate the undesirable effects of quinine are brought forward. An ester is technically pronounced to be "any compound ether which has an acid and an alcohol radical" (Amer. Illustrat. Med. Dict.). Euquinine = quinine-carbonicester is held to be a production which meets the want supplied. Other derivatives are acetylquinine, benzoylquinine, phosphorylquinine, saloquinine. The firstnamed is not of practical therapeutic use owing to its taste, the second and third are well nigh inert sub-The fourth on the list, saloquinine, not to be confounded with salicylate of quinine, acts as a mild quinine, and has some merits as a germicide, but its chief use is stated to be its analgesic effects in neuroses and neuralgias. A compound termed "rheumatin," a salicylate of saloquinine, is stated to be highly valuable in acute articular rheumatism.

### CHOLERA.

CHOLERA IN THE PHILIPPINES.—Cholera has, for a considerable time, been reported prevalent in the Philippines. Although its ravages have been noticed chiefly amongst the natives the American soldiers have not wholly escaped.

The report received from General Chaffee by the War Department at Washington, on June 22nd, shows that the army in the Philippines is seriously affected by the cholera raging there. The report referred to states that twenty-two enlisted men died of cholera in the two weeks between April 23rd and May 6th.

Despatches sent out from Manila on June 21st stated that cholera was spreading in the islands. Thirty-five cases were reported in Manila on June 19th and twenty-eight deaths. The totals up to June 21st were 1,490 cases, and 1,197 deaths in Manila, and 6,959 cases and 5,098 deaths in the provinces.

This news is of a very grave nature, for if cholera of the type common in the far east gains a foothold among the American troops, the probability is that it will spread with great celerity and cause a large

mortality.

Asiatic cholera is one of the most dreaded diseases of the East, and shares with the plague the undesirable notoriety of claiming more victims than any other malady of that region. However, the United States Military Medical Department of the Philippines may be relied upon to take every step known to sanitary science to stamp out and to curtail the spread of the disease.—Med. Rec., June 28th, 1902.

The Fifty-third Annual Meeting of the American Medical Association was opened in Convention Hall, Saratoga Springs, N. Y., on Tuesday, June 10th, 1902, at which the following subjects were discussed.

Amæbic Dysentery in Michigan. - Dr. George Dock, of Ann Arbor, reported the case of a farmer who had not been out of Michigan for nine years and who developed chronic diarrhoea in the summer of 1901. The drinking water was not examined but was not obviously contaminated. Examination showed that the numerous small stools almost always contained mucus, blood, some leucocytes, and occasional small and superficial sloughs. In the mucus there were almost always Charcot's crystals and amœbæ, the latter usually in large numbers. The amœbæ measured from 20 to 30 microns in diameter; they contained red blood corpuscles almost always, and showed the characteristic motion. The patient's blood serum did not react with a culture of the Shiga bacillus furnished by Professor Flexner. No characteristic bacilli could be cultivated from the stools. Quinine enemata were almost entirely without effect on the process. Sublimed sulphur, in from 40 to 60 grain doses a day, had some effect on the number and character of the stools, and under its use the amœbæ became less numerous but did not entirely disappear. This was the first case of amorbic enteritis the writer had found in Michigan. In a case of ulcerated carcinoma of the rectum a smaller amæba was found without enclosed blood corpuscles. In a large number of cases treated with Carlsbad salts, amœbæ were never found, and the writer denied the truth of the assertion frequently made, that amœbæ were common parasites in healthy men. The writer discussed the relation of amœbæ to enteritis and urged the need of further work in American dysenteries.

Dr. McCrae, of Baltimore, said that several years ago he had seen one case occurring in a man who had never been out of the State of Maryland; this contradicted the assertion that all cases came from the south. In Maryland the disease was not infrequently found. A point of increasing interest was the fact that the disease was being more often noted in children, the majority of cases coming from the habit of many of these children of drinking the impure water from the street gutter.
Dr. James J. Walsh, of New York, had seen two

such cases occurring in New York.

Dr. E. Libman, of New York, mentioned the frequent occurrence of liver abscesses at the Mt. Sinai Hospital, New York.

Dr. Dock, in closing, said that he did not include in his paper such cases occurring in soldiers who returned from Cuba or the Philippines.

TROPICAL FRAMBESIA AND TINEA IMBRICATA. By John T. Bowen, M.D., Boston.

Professor Koch1 contributes some interesting facts about these tropical affections, gathered during his travels in New Guinea and the neighbouring groups of islands of the South Sea. He speaks of the lack of good pictorial representations of these affections in the literature, and is able to contribute several valuable photographs.

With regard to frambesia, it is said to be very extensively found throughout the tropics, appearing in many parts of Africa, in the East and West Indies, in the Indian Archipelago, and in China. It is somewhat doubtful, however, if the type is the same in all

of these regions.

The frambesia seen in the South Seas is a contagious affection and can be inoculated from one person to another. One attack produces immunity. In places where it is endemic it is chiefly seen in children, as almost all people are attacked once. In certain places children are inoculated with it, in order that they may have it quickly and lightly, as was long ago the practice in the case of variola. Most of the children seen by Koch were between one and twelve years of age. The lesions are ulcers approximately circular in form, often grouped or confluent. They always project above the surface of the skin, and appear as luxuriant granulations lying upon the skin. The smallest lesions looked not unlike a variola pustule, with a marked umbilication in the centre. larger lesions were always denuded of epidermis, exuded a serum and pus, and were covered with moist crusts, which exposed, upon removal, the exuberant granulating mass. When situated near the anus or genitals they resemble condylomatalata very closely, and are sometimes mistaken for the latter. same child the most varied stages of the individual nodules may be met with, including small nodules still covered with epidermis, and all stages of ulcerated nodules. The lesions are especially frequent

<sup>1</sup> Arch. f. derm. u. Syph., January, 1902. - Boston Med. and Surg. Journ., June 12, 1902.

about the mouth and genitals. The paper is illustrated by several good photographs. The nodules do not all appear at once, but from time to time, until the susceptibility of the patient for the disease has been overcome. The duration is from some months to a year. Infants or very young children frequently die of the disease. It is not known that Europeans are ever affected. Various micro-organisms have been described as causing the disease, but none have been substantiated.

Tinea imbricata also seems to find its chief habitat in the South Sea Islands, and to have spread out from there to China and the Straits Settlement. This is caused by a parasite similar to the Tricophyton tonsurans, which grows in the rete, and like ringworm develops in the form of circles, but does not tend to heal in the centre, so that annular appearances are not produced. The epidermis exfoliates in small scales, which remain adherent by their peripheral part, and present somewhat the appearance of the tiles of a roof, whence the name imbricata. There is a considerable amount of pruritus. In the photographs large surfaces of the body are covered with the circular scaling lesions, which produce a most extraordinary appearance. One remarkable picture is that of a child showing the earliest manifestations, where the sternal region is the seat of an enormous circular lesion. The affection is very common in adults, and sometimes almost all the inhabitants of a village may be affected. In adults, as a rule, almost the whole body is affected, so that Koch believes that the affection makes its appearance at a very early age, spreads gradually over the whole body, and, as far as he can determine, never heals spontaneously. It appears to have no essential effect on the general health.

#### PLAGUE.

PREVALENCE OF THE DISEASE.

INDIA. - During the weeks ending June 7th, 14th and 21st, the deaths from plague in India numbered 2,473, 1,316 and 1,294 respectively.

EGYPT.—During the weeks ending June 15th, 22nd, 29th, and July 6th, the fresh cases of plague in Egypt were returned as 4, 5, 8 and 11; and the deaths from the disease as 1, 2, 7 and 7 respectively.

CAPE OF GOOD HOPE.—The number of fresh cases of plague for the weeks ending June 7th, 14th and 21st were reported to be 1, 1, and 0; and the deaths from the disease as 0, 2 and O respectively.

Hong Kong.—During the weeks ending June 28th, July 5th and 12th, the fresh cases of plague numbered 44, 38 and 28; and the deaths from the disease, 43, 31 and 27 respectively.

CONSTANTINOPLE. - On June 30th, 4 cases of reported from Constantinople; 1 death was announced.

#### EXCHANGES.

Annali di Medicina Navale. Archiv für Schiffs u. Tropen Hygiene. Archives de Medicine Navale.

Archives Russes de Pathologie, de Médec. Clinique et de

Bacteriologie. Australasian Medical Gazette. Boletin de Medicina Naval. Boston Medical and Surgical Journal. Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal o Dermatology.

British Medical Journal. Brooklyn Medical Journal. Caducée. Climate. Clinical Journal. Clinical Review. Giornale Medico del R. Esercito. Hong Kong Telegraph. Il Policlinico. Indian Engineering. Indian Medical Gazette. Indian Medical Record. Janus. Journal of Balneology and Climatology. Journal of Laryngology and Otology.

Journal of the American Medical Association. La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal Medical Brief. Medical Missionary Journal. Medical Record. Medical Review. Merck's Archives.

New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyclinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo.

Sei-i-Kwai Medical Journal.

The Hospital. The Northumberland and Durham Medical Journal. Treatment.

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Editors

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In order to meet the constant enquiry for addresses of respectable firms catering for the various requirements so difficult to obtain abroad, we give a list of names and addresses which we trust will be found useful to our numerous correspondents and subscribers.

## Original Communications.

#### STUDIES IN PLAGUE.

By Professor C. TERNI.

Of the Bacteriological Institute of Messina, Italy. (Continued from page 223.)

TEMPERATURE IN PLAGUE. DISTURBANCES OF THE RESPIRATORY AND CIRCULATORY SYSTEMS.

EXCEPT when a furuncle or other local trouble occurs at the seat of inoculation no increase of temperature is observed in plague, until the lymphatic glands, the lungs, or the intestinal tract give evidence of being affected. An initial febrile period, ushered in by rigors, obtains, in which the temperature rises quickly to 39° or 40° C., and continues within these limits, with short remissions, for from three to six days. This period, during which the primitive bubo is formed, is succeeded by a fall by crisis, or in cases in which the bubo is reabsorbed or suppurates the fall is gradual. During suppuration the common pyogenic germs may by their presence cause an elevation of temperature, which ceases when the bubo is opened. What I call the spontaneous suppuration of the plague bubo in mild cases is not attended by pyrexia or the presence of pyogenic bacteria in the pus. When, however, as in grave cases, the infection extends to lymphatic glands other than the initial, the temperature continues to rise to 39° or 40° C., and this, the second period of the illness, ends in death or in protracted recovery. The second period might correctly be termed the septicæmic, for it marks the passage of the infection from the primary bubo to the circulatory system, and the temperature shows oscillations in direct proportion to the occurrence of new plague foci. In the gastro-intestinal form of the disease the same fluctuations occur as fresh mesenteric glands become involved in the bubonic lesions. In the acute gastro-intestinal form of plague, after a short period of high fever, collapse occurs, and the temperature remains low until death occurs. In pneumonic plague and in the septicæmic form the temperature, after a short remission, keeps high until death occurs. In all acute cases, however, the temperature constantly shows an initial period of fever, followed by a slight fall, to be followed again by marked remissions. It is this period of subsidence of fever which proves delusive, and is wont to be attributed by the inexperienced as evidence of recover, resulting from treatment by medicines, by plague serum, &c.

It is remarkable that secondary febrile accessions due to plague are never accompanied by rigors, nor are they attended by perspiration; these are characteristic symptoms in febrile conditions due to the presence of pyogenic germs, and their absence in plague amount

to a diagnostic feature.

The Disturbances in the Circulatory System commence early. The pulse increases in frequency to 120 to 130 beats per minute, independently of an increase in temperature. During the first few days of the illness it keeps strong, full and elastic; when the disease becomes general the frequency is still greater, but the sphygmographic curve diminishes in range until the waves of accession of all are reduced to well-nigh a straight line. A dicrotic pulse is common in the early periods of the pneumonic, the septicæmic and the gastro-intestinal forms of the disease.

The contrast between the pulse-rate and the thermic curve when collapse occurs is marked, for we find that in very low temperatures the pulse rises to 160 to 180 or over.

Even during convalescence and for a month after the cessation of fever the pulse frequency may continue at 120, probably until all absorption from the focal lesion has ceased.

Removal of the bubonic glands causes an immediate fall in the pulse-rate; this phenomenon indicates extirpation of the primary gland as a surgical step of imperative necessity, being a much more reliable therapeutic agent than doubtful antitoxin remedies.

The gravest cardiac lesions are those of a paralytic nature, which apparently are due to degeneration of the plague bacilli. It is found in these paralytic states that the bacteria are vacuolised or have degenerated into a disc, or ring-like shape, and exhibit few of the characteristic microscopic features of the live bacillus of plague. It would appear as though the protoplasm of the bacillus had escaped by dialysis through the bacterial wall and set up toxic changes, resulting in paralysis of the cardiac muscle.

Experiments by Lustig and Galeotti and by myself show that the poison extracted from plague bacteria and with juices filtered from buboes and organs in plague cases directly cause circulatory disturbances, and that even the delirium and stupor met with are due to circulatory rather than to nervous disturbance. The lesion does not, however, lie in the heart muscle or in the nervous supply of the heart, but in the effect the poison has on the vaso-motor system. It is a case of vaso-motor paralysis, which chiefly manifests itself in the capillary innervations; the heart paralysis being secondary.

#### MICROSCOPIC EXAMINATION.

The following method of staining and preparing specimens for microscopic examination of the plague bacillus gives good results :-

(1) Spread a thin stratum of the juice obtained from a bubo, from the excreta, the vomit, the organs or tissues of dead bodies, or of the blood on a slide; should the specimen be coagulated dilute with a drop or two of distilled water.

(2) Dry over a flame with moderate heat.(3) Fix the specimen by exposing it for from three to ten minutes to Roux's fluid (equal parts of absolute

alcohol and ether); dry again by moderate heat.

(4) Colour with the following fluid: distilled water 100 parts, crystallised phenic acid 2 parts, saturated alcoholic solution of gentian and violet or fuchsin 10 Of this solution add 20 to 30 drops to 30 cm. of distilled water and with it stain the preparation for a few seconds.

(5) Wash well with distilled water, dry and mount

the specimen permanently.

With the plague bacilli in certain stages of the disease may be found pyogenic micrococci, streptococci, the diplococcus of Frankel and, more rarely, the coli-bacillus, &c., but to an experienced bacteriologist these accessory bacteria can hardly cause confusion.

The diplococcus is more likely to cause hesitation in arriving at a positive conclusion than any other form of bacterium. In the gastro-intestinal catarrh due to plague, the bacilli will be found gathered for the most part into zooglea, adherent to the epithelium or flakes of mucus; on the other hand they may appear as a chain or almost as a pure culture.

Plague bacilli do not appear in the blood as a rule until the disease is well advanced and even then they are usually few in number. When they are met with in the blood the plague bacilli are usually found to be well vacuolised, and occur sometimes isolated, sometimes in pairs, or, again, in chains of three or four elements; they present, moreover, an evident capsule,

so much so that they may be mistaken for diplococci. As both the diplococci and the plague bacilli present great variability in form and size it is always well to employ Grassi's method as a means of differential diagnosis.

In plague pneumonia the bacilli are usually present in extraordinary quantity and are commonly associated with diplococci. The plague bacilli may occur in the pneumonic form singly, or gathered into zooglea, and are never encapsuled.

Bacterological Examination.—In glycerine agar culture medium (3 per cent.) at a temperature of from 30° to 35° C., the plague bacillus produces colonies, visible to the naked eye, within twenty-four hours. At first the colonies resemble those produced by streptococci, or diplococci, but microscopic examination will at once clear up the diagnosis. As a further test of the diagnosis it is requisite that the effect upon animals be tried. To accomplish this: sow a portion of the juice gathered from a bubo in tubes of glycerine bouillon (3 per cent.) and inject it by the syringe into the peritoneal cavity of a guinea-pig. In twelve hours the peritoneal fluid of the guinea-pig may show a prolific growth of plague bacilli. This test holds good even when the bacilli in the blood, or juices used, are very scanty.

In coming to a conclusion as to the diagnosis of plague by microscopic and bacteriological examination, the following points are to be noted and

observed :-

(1) The plague bacillus has well-defined specific morphological characters.

(2) There is no acute adenitis produced by germs which can be mistaken for bubonic plague.

(3) Acute adenitis, when the clinical characters of plague are present, require to be investigated bacteriologically.

(4) The microscopic and bacteriological diagnosis of

plague are founded on positive scientific data.

(5) When it has been established by bacteriological examination that plague is present in a locality, the clinical symptoms are alone sufficient to establish a diagnosis.

(6) The characteristic signs and symptoms of

plague are :-

(a) Fever, ushered in by rigors with lancinating pains in a lymphatic gland or glands, and subsequent swelling of the painful gland or glands.

(b) Increased frequency of the pulse independently

of a rise in temperature.

(c) The bubonic swelling is tense, movable under the skin and on the deeper tissues, non-fluctuating and painful on palpation; by the 3rd or 5th the

bubo attains its maximum size.

(d) Symptoms of a general toxic state do not correspond with the changes and condition of the primary glandular lesion. Of all signs and symptoms to be noted in plague the nature of the pus from the bubo and the character of the pulse are of most consequence. The more sanious the pus the more virulent is the disease, and as long as there is a focus of suppuration, and consequently a liability to general blood poisoning by the plague bacillus, so long will the small and frequent pulse obtain; this marked feature in regard to the pulse continues even when the temperature is almost, or wholly, normal. In mild cases in which rapid suppuration occurs, the specific bacillus of plague disappears from the pus and even from the walls of the bubo after two or three days.

THE THEORY OF THE CAUSATION OF BERI-BERI BY A TOXIN CONVEYED BY RICE, CONSIDERED IN THE LIGHT OF LOCAL EXPERIENCE OF THE DISEASE.

By E. A. O. Travers, M.R.C.S., L.R.C.P. State Surgeon, Selangor.

(Published by permission of the Colonial Office.)
THE THEORY ORIGINATED IN JAPAN.

THE theory to the effect that the consumption of certain kinds of rice plays an important part in the causation of beri-beri, was, I believe, first promulgated by the Japanese, in connection with an extensive outbreak of the disease in the Japanese Navy.

Recently, special attention has been drawn to this theory by Dr. Braddon, State Surgeon of Negri Sembilan, who, in a paper read before the Conference of Medical Officers of the Federated Malay States, held in 1900, and again in a Memorandum on the subject published by Government in 1901, very strongly advocates this theory, which he formulates as follows:—

THE THEORY AS FORMULATED BY DR. BRADDON.

"The original cause is assumed to be a mould or microbe which grows upon padi (and possibly other grain) in the places in which beri-beri is endemic. When the padi has been reaped and stored, the mould, or its spores, remained undestroyed (like ergot in rye, or the cause of pellagra in maize, or of lathyrism in vetch), and may possibly continue to grow and multiply. When such padi is husked or milled, the spores fall into the bras, where, under favouring circumstances—chief among which are probably warmth and moisture—they grow, and produce a ferment or toxin. The consumption of the bras or rice so poisoned is that which is conceived to be the cause of beri-beri."

IMMUNITY OF TAMILS FROM BERI-BERI THE MAIN ARGUMENT IN SUPPORT OF THEORY.

Dr. Braddon's main argument in support of this theory is that Tamils, or natives of southern India, who form about 83 per mille of the population of Selangor, very rarely suffer from beri-beri.

This immunity Dr. Braddon refers to as follows:—
"To what cause can this protection be ascribed?

"In the answer to this question lies the key to beri-beri.

"In reviewing the habits of life of the different races which might be conceived to affect the genesis or incidence of a disease such as beri-beri, one and only one factor appears as a constant difference between Tamils and others, which seems in any way likely to be able to account for his protection from the disorder: it is that the staple food of the Tamils throughout these States, as also of the 70 or 80 millions of these fellows in their native country, differs from that consumed by every other nationality.

"That food is rice, but it is rice which is, in fact,

prepared before use in a manner not customary with any of the other races, and by a process which forms, indeed, a more or less efficient method of sterilisation.

"The rice eaten by Tamils, grown in whatever district, is prepared from padi which is always either steamed or scalded in the husk, and thereafter dried before milling. Rice prepared in this manner is

known as Bengal rice.

"By such a process any poisonous fungus growing in or upon the husk of the grain would naturally be destroyed, so that there would remain during the milling no contaminatory germ or body which could fall into the rice so as to be able afterwards to grow there and to give poisonous properties to it. Such a factor, and no other that has hitherto been suggested, will, if my view of the causation of beri-beri as an intoxication be correct, account for the protection of the Tamils from a disease which decimates all around them."

With the object of illustrating the marked immunity from beri-beri enjoyed by Tamils in these States, Dr. Braddon gives a number of figures, the more important of which are as follows—(I have taken the figures for Selangor only):—

"YEAR 1900.
"Estimated Tamil population ... ... 14,244
"Proportion of Tamils per 1,000 of estimated total population ... ... 88
"Proportion of Tamils per 1,000 admissions to State Hospitals for Beri-beri ... ... 9"

TAMILS ALSO ENJOY AN IMMUNITY FROM LEPROSY.

These figures conclusively prove that Tamils enjoy an extraordinary immunity from beri-beri; but they also enjoy an almost equally remarkable immunity from leprosy, as may be seen by the following figures:—

Number of Lepers admitted to Asylum during last five years	512
Number of Tamil Lepers admitted during the	012
Proportion of Tamils per 1,000 of estimated	94
population Proportion of Tamils per 1,000 admissions to	83
Asylum for leprosy	17.3

As the bacillus of leprosy is now well known, I do not think that the advocates of the rice theory of beri-beri would be prepared to say that leprosy is caused by a germ or toxin generated in a form of rice which is not eaten by Tamils. If, however, they are not prepared to account for the immunity of Tamils from leprosy in this way, then little importance can be attached to the same theory with regard to beri-beri.

OTHER DIFFERENCES BETWEEN HABITS OF TAMILS AND OTHER NATIONALITIES.

In considering the difference between the habits of life of the Tamils and other nationalities which can account for the immunity from beri-beri of the former, it is difficult to see why only the food supply should have been mentioned. The fact that Tamils regularly anoint themselves from head to foot with gingelly oil, in taking what they call the oil-bath, is quite as striking a difference between the habits of the Tamils and those of other nationalities, and is as likely to protect them from beri-beri as a slight difference in the method of preparing their rice.

Then, again, the Chinese, who are the chief sufferers

from beri-beri, are in the habit of watering their vegetables with liquid human manure. This unsavoury custom is peculiar to the Chinese, and might be advocated as a cause of beri-beri, and as a reason why the Tamils do not suffer from the disease.

It will thus be seen that Dr. Braddon attaches too much importance to the fact that Tamils enjoy a marked immunity from beri-beri, inasmuch as they enjoy practically the same immunity from leprosy.

It is a well-known fact that certain diseases are peculiar to certain races, and that, on the contrary, in many places a certain race will not suffer to any extent from a disease which may be very common among other nationalities in the same country.

OUTBREAK OF BERI-BERI IN THT PUDOH GOAL.

In the month of August, 1895, the prisoners incarcerated in the large local prison known as the Pudoh Goal, were severely attacked with beri-beri, which has since caused a large number of deaths, and has continued, with occasional slight intermissions, up to the present time.

An opportunity has been thus afforded for making many observations and experiments with regard to the disease, some of which are of great importance in connection with what may be called, shortly, the Rice Theory of the Causation of Beri-beri.

DIET OF PRISONERS.

The diet of the Chinese prisoners, as well as of the patients in the various large hospitals in the district, consists mainly of so-called Rangoon rice, with fresh vegetables and either fresh pork or salt fish.

The food is supplied by a Chinese contractor who purchases his rice from merchants in Penang. The rice arrives in bags, and at no one time has more than 150 bags, or about a three weeks' supply, been imported. The Penang merchants procure the rice from many districts, but mainly from Rangoon. The rice for the prisoners is sent to the Pudoh Gaol at intervals of about three to four days.

It is cooked by steam, which is forced through it at a high pressure by means of a small vertical engine.

The Pudoh Gaol was occupied in January, 1895, previous to which all prisoners were confined in what may be called the Old Gaol, Kuala Lumpur, about a mile and a half distant. While in the Old Gaol none of the prisoners contracted beri-beri, although they were fed on the same kind of rice, procured from the same source as that given them when in the Pudoh Gaol.

This is well shown by the following figures:-

Year	Rice Supply	Cases of Beri-beri Admitted to Infirmary	Deaths from Beri-beri	Remarks
1892	from (	6		These cases were admitted with the disease, and did not contract it in the gaol.
1893 Gao	rice from	2	1	These cases were not con- tracted in gaol.
1894)	1 02 [	3		These cases were not con- tracted in gaol.
1895) 등등	ng(	158	34	Contracted in gaol.
1895) do 1896 1897) do 29 1897) do 29	Rangoon same	478 275	42 54	" " "

APPARENT CAUSE OF OUTBREAK: CHANGE OF LOCALITY AND NOT RICE SUPPLY.

It is evident, therefore, that in this case the outbreak of beri-beri occurred immediately after a change in the location of the prisoners, the supply of rice remaining the same.

The case mortality from beri-beri in the Pudoh Gaol Infirmary being extremely high, and in view of the apparent influence of locality on the disease, all patients suffering from beri-beri were transferred to the Old Gaol on October 1st, 1895, in the hope that the change of residence might prove beneficial. The result of this arrangement is shown as follows:—

	Period	No. of Beri- beri Cases Admitted	Per- centages of Deaths	Remarks				
	September		32	31.7	Beri-beri cases treated in Pudoh Gaol.			
1895	October November December		35 28 25	15·57 6·15 4·25	Beri-beri cases treated in Old Gaol.			

The food for the beri-beri cases treated in the Old Gaol was not only exactly similar in every respect to that used in the Pudoh Gaol, but it was actually cooked in the Pudoh Gaol with the food for the other prisoners, and was conveyed in a handcart to the Old Gaol.

Encouraged by the evidently beneficial results of change of locality on the sick prisoners, arrangements were made to experiment still further in this direction. On October 21st, 1895, sixty prisoners showing no signs of beri-beri, and in apparently good health, were transferred from the Pudoh Gaol to the Old Gaol; from this date to July, 1896, a large gang of prisoners were confined in the Old Gaol.

The monthly average number of prisoners in each gaol during this period, with the number of fresh cases of beri-beri occurring among them, is shown by the following figures:—

FIGURES SHOWING MONTHLY AVERAGE NUMBER OF PRISONERS IN EACH GAOL.

Month		Month		Average No. of Prisoners in Pudoh Gaol	No. of Beri- beri Cases occurring in Pudoh Gaol	Average No. of Prisoners in Old Gaol	No. of Beri- beri Cases occurring in Old Gaol
October November December January		297 337 271 280	38 21 28 29	72 119 128 133	Nil.		
February March April May June		286 271 275 299 287	47 43 42 36 39	130 119 97 106 84	, , , , , , , , , , , , , , , , , , ,		

FOOD SUPPLY THE SAME IN BOTH GAOLS.

From October 1st to December 14th, 1895, all food supplied to the healthy prisoners in the Old Gaol, as well as to the beri-beri patients transferred from the Pudoh Gaol, was, as has been stated above, cooked in the Pudoh Gaol, with the food for the other prisoners, and carried to the Old Gaol twice daily, the diet being exactly the same at both gaols, and the rice being taken out of the same bag and cooked in the same steamer. After December 14th, 1895, the rations for the prisoners in the Old Gaol were cooked in that institution, raw rations, with the exception of rice, being sent daily from the Pudoh Gaol. The rice was sent direct from the contractor to the Old Gaol, where it was kept in bags and used as required. It may, I think, be fairly claimed that the opportunity for experiment with regard to the influence of food supply on the etiology of beri-beri presented by the outbreak at the Pudoh Gaol has been an exceptional one, and that full advantage has been taken of it.

# No Connection between Rice Supply and Outbreak of Beri-beri.

The results of these experiments and observations seem to indicate very clearly that in, at any rate, this instance there was no connection of any kind between the outbreak of beri-beri and the food supply.

According to the theory formulated by Dr. Braddon, it is assumed that a mould or microbe forms on the padi when growing in a place where beri-beri is endemic; that when the padi is husked or milled the spores fall into the rice, and there, under favouring circumstances, they grow and produce a ferment or toxin, which is conceived to be the cause of beri-beri.

It will be seen that the whole chain of events is assumed, and that no detail of the theory is based on actual observation or practical test. If, however, the mould, the spores, and the toxin are taken as actually existent, it is extremely difficult to apply the theory

to our experiences in Selangor.

There are in our chief town, called Kuala Lumpur, three other large institutions, under the care of the Medical Department—the District Hospital containing about 450 beds, the leper asylum with 130 beds, and a hospital for incurables containing 60 beds. These institutions and the Pudoh Gaol are within three miles of each other, and the conditions of temperature, moisture of air, &c., are practically the same.

The rice supplied for the inmates of these institutions is of the same kind, and is obtained from the same contractor, as that used in the Pudoh Gaol. The contractor assures me that the rice as received from Penang is distributed to the different hospitals, and that in no case is any of the rice kept in Kuala Lumpur for more than three weeks.

Throughout the six years during which beri-beri has been endemic at the Pudoh Gaol there has been no outbreak of beri-beri at any of the institutions

mentioned.

If, therefore, the rice infected in Rangoon, or wherever it grew, was the cause of beri-beri among the prisoners in the Pudoh Gaol, why did it not cause a similar outbreak in the Leper Asylum, District Harrist and Harrist for Incomples?

trict Hospital, and Hospital for Incurables?

If, however, it be assumed that the rice was either not infected, or at any rate the toxin was not produced in it, when it reached the Pudoh Gaol, but that this occurred during the period (at no time exceeding four days) during which the rice was kept in bags at

the gaol, then the immunity of the other institutions might be accounted for. The fact, however, that the prisoners transferred to the Old Gaol enjoyed complete immunity from beri-beri, although fed on rice from the same source and actually cooked in the same steamer as the prisoners in the Pudoh Gaol, who were suffering severely from the disease, effectually disposes of this supposition.

The outbreak of beri-beri at the Pudoh Gaol has presented many other extremely interesting features which it is not necessary for me to mention here, but which will be given in detail in a history of beri-beri in the Gaol now being written by Dr. Hamilton

Wright and myself.

I have in this memorandum only mentioned those circumstances which bear especially on the rice theory of the causation of beri-beri. I have done this in the hope that our experiences in Selangor may be of use to those now occupied in making investigations into

the etiology of this interesting disease.

The case of a Chetty, who developed beri-beri at Malacca during the year 1901, is of considerable interest in connection with the "rice theory" and the causation of beri-beri. This man was under my treatment in Kuala Lumpur, and the case was carefully observed by Dr. Hamilton Wright and myself. The Chetty was a high-caste Tamil of considerable wealth, and during the three years he had resided in the Straits Settlements he had never eaten any but the very best Bengal rice (Puloonga arisi) imported from India by the Chetties themselves.

The case was a very typical one of paralytic beriberi, and is of interest as an instance in which a Tamil contracted beri-beri although he had never eaten any but Bengal rice, especially prepared in the way men-

tioned by Dr. Braddon.

Sanitary Report of Hong Kong for the Year 1901.—The Medical Officer of Health for the colony of Hong Kong, Dr. Francis W. Clark, has favoured us with a copy of the Annual Sanitary Report. The report is drawn with care and with a scientific accuracy which renders reports of the kind valuable additions to medical literature.

Malarial Fevers.—The death rate amongst the Chinese from malaria amounted to 1.9 per 1,000.

Beri-beri.—Of the Chinese, 377 persons died of beri-beri; the deaths were distributed during the year as follows: January, 26; February, 34; March, 14; April, 22; May, 26; June, 16; July, 23; August, 40; September, 47; October, 44; November, 51; December, 38. Dr. Clark is inclined to attribute beriberi to infected food, and most probably to damaged rice or other grain affected by fungoid growth.

Plague.—During the year 1,562 persons died of plague; yet in spite of the persistence of plague in the colony, the death rate shows a considerable reduction during the past ten years as compared with the previous, the former standing at 27.81 per 1,000,

the latter at 23.42 per 1,000.

#### BIRTH.

On July 23rd, at 26, Upper Phillimore Gardens, Kensington, London, W., the wife of Dr. Percy Athelstan Nightingale, of Harrogate, of a son.

# Journal of Tropical Medicine.

PRIZE ESSAYS ON SUBJECTS CONNECTED WITH TROPICAL DISEASES.

1.-- A prize of the value of £10, entitled the

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PRESENTED BY THE

#### HON. SIR JAMES SIVEWRIGHT, K.C.M.G., LL.D.,

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"The Duration of the Latency of Malaria after Primary Infection, as proved by Tertian or Quartan

Periodicity or Demonstration of the Parasite in the Blood,"

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## DR. ATTILIO CACCINI,

Assistant Physician, Hospital of Santo Spirito in Sassia, Rome.

The papers sent in for this prize by John T. Moore, M.D., Demonstrator of Medicine, Medical Department, University of Texas, and Chief of Medical and Nervous Clinics, John Sealy Hospital, Galveston, Texas; and by A. Sims, M.D., C.M.(Aberd.), D.P.H. (Birm.), Certificated London Tropical School of Medicine, late Medical Officer, Congo Free State, and Civil Surgeon of French Government (Brazzaville), were considered so excellent that they were published in full in the Journal of Tropical Medicine.

2.-A prize of the value of £10, entitled the

#### BELILIOS PRIZE.

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#### HON. E. R. BELILIOS, C.M.G.,

FOR THE BEST ARTICLE ON

"The Spread of Plague from Rat to Rat, and from Rat to Man by the Rat-flea,"

HAS BEEN AWARDED TO

#### DR. BRUNO GALLI-VALERIO,

Professor in the University of Lausanne, Switzerland.

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#### LADY MACGREGOR PRIZE,

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#### LADY MACGREGOR,

FOR THE BEST ARTICLE ON

"The best Method of the Administration of Quinine as a Preventive of Malarial Fever."

THIS PRIZE WAS NOT AWARDED.

Judges—Surgeon-General Roe Hooper, C.S.I., President Medical Board, India Office; Colonel Kenneth MacLeod, LL.D., Professor of Clinical and Military Medicine, Netley; Patrick Manson, C.M.G., F.R.S., LL.D., Medical Adviser, Colonial Office and Crown Agents of Colonies.

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# Journal of Tropical Medicine

AUGUST 1, 1902.

## British Medical Association.

SECTION OF TROPICAL DISEASES.

INTRODUCTORY REMARKS MADE AT THE ANNUAL MEETING OF THE BRITISH MEDICAL ASSOCIATION, HELD IN MAN-CHESTER, JULY—AUGUST, 1902.

By Sir William R. Kynsey, C.M.G. F.R.C.P.I. President of the Section.

IT affords me great pleasure to preside over this Section, and the honour conferred upon me by the British Medical Association in appointing me your President is one I highly appreciate. I accepted the position, I may assure you, as a compliment to the Colonial Medical Service, in which I spent many years of my life.

It is the usual custom for the President to open the scientific business of this Section with some introductory remarks on matters of interest. remember the high professional standing and the discoveries of those who have preceded me in office, I feel constrained to ask your kind indulgence for any defects that may be apparent in the observations I address to you. I have read with interest and instruction the addresses which have been delivered from this chair, and I find it impossible to choose a topic in connection with tropical medicine which has not been already ably touched upon by my

predecessors.

By the Memorandum of the Association for the guidance of officers of Sections, the Presidents are wisely requested not to deliver a formal address in opening their Sections, so as not to interfere with sectional work, and that any introductory remarks should not occupy more than fifteen minutes. I need hardly state that under such instructions it would be impossible for me, even if I possessed the necessary knowledge, to review the advances of tropical medicine during the past year, or to dwell on our ignorance of the causation of many of the ordinary diseases met with in tropical practice.

In the words of Lord Salisbury on a memorable occasion, "We live in a small bright oasis of knowledge surrounded on all sides by\_a vast, unexplored region of impenetrable mystery. From age to age the strenuous labour of successive generations wins a small strip from the desert and pushes forwards the boundaries of knowledge"; or, as that great philosopher, Professor Huxley, well puts the same idea, "The known is finite, the unknown infinite: intellectually we stand on an islet in the midst of an illimitable ocean of inexplicability; our business in every generation is to reclaim a little more land, to add something to the extent and solidity of our possessions."

Marvellously minute observation is perhaps the most notable feature of scientific research in the last quarter of the nineteenth and the opening years of the twentieth centuries, combined with a severe spirit of criticism, and that now, as has always been the case, science, like religion, metes out its rewards only to those who diligently seek it. In medicine one of the most surprising discoveries has been the relationship which has been proved to exist between insects and grave disease—the direct outcome of the modern

spirit of research.

I have no intention of occupying your time with an account of the successive malarial discoveries made by observers of different nations which can now be found in the text-books, and are known even to the man in the street, nor with the unworthy questions too often raised by discussions about priority. But it cannot be too often repeated that in the whole story of medical science there has been recorded nothing more wonderful than the prophylactic measures which have followed on the discovery of the malarial organism by the illustrious Frenchman, Laveran, and by the investigations into its life-history by Italian, German, and American observers, and by our own countrymen, Manson and Ross, according to the experimental method advocated by Bacon and Harvey If these investigators have no other reward, they will have the highest satisfaction men of science can enjoy -that of extending our knowledge of disease and of doing good to humanity. I consider the discovery of the malaria parasite—and that man is its temporary and the mosquito its definite host and transmitter, that it completes asexual life and prepares its sexual forms in human blood, while it completes the sexual cycle of life, that by which the life of the parasite external to man is assured in a particular species of mosquito, and that man becomes infected only through

the bite of the Anopheles—one of the most epochmaking events of the age in which we live. It may be truly said that scientific research has gone hand in hand with practical and preventive medicine. The physician can give quinine with a full knowledge of how his remedy acts; and the sanitarian can try, and in many cases succeed in preventing the occurrence of malarial diseases by methods devised on scientific principles. The treatment and the modern prophylaxis of malaria exemplifying the Greek idea of Socrates and Plato that "right knowledge involves

right action." Another most gratifying result of the study of the causation of malaria, and directly traceable to it, is the increased interest taken in the investigation of all tropical diseases by the establishment of schools of instruction, and the formation of scientific expeditions and travelling scholarships. In the schools of tropical medicine of London and Liverpool, and from the lectures on diseases of the tropics in many of our colleges, the medical man intending to practise abroad can acquire an acquaintance with the diseases he will be called upon to treat, special advantages long enjoyed by the army, Indian, and naval services in the great schools of Netley and Haslar. I have the most grateful recollection of the instruction I received at Netley, where diseases from all parts of the world could be seen and studied. No one who had the privilege of their acquaintance can forget the gifted and amiable Parkes, the father of hygiene; that accomplished gentleman speaker and writer, Maclean, whose lectures may still be read with profit; and Aitken, the first pathologist of his day, whose work is a storehouse of facts relating to tropical medicine. It is pleasant for an old Netley man to feel that the instruction in that great school has not deteriorated, and that it continues to send forth highly-trained officers, ever ready to fight disease in any part of the world. If the rumour is true that the army school is to be soon moved to London, I am sure you will all join me in

wishing it a brilliant future. In the history of the past year there is no great discovery to be recorded; it may be looked back upon as one of steady progress in elucidating some of the many problems of tropical medicine, the greatest and most beneficient being in the scientific prevention of disease. In the case of yellow fever the mosquitoa Culex, not Anopheles—has been tried and found guilty of being the sole agent in the spread of that disease. In Havana, yellow fever was endemic for a century and a half; during the past year it has been freed from the scourge by killing the mosquitoes in the neighbourhood of each focus of disease as discovered. and by carefully disinfecting every house that had lodged a yellow fever patient in order to destroy the mosquitoes that had bitten a sick person. This great sanitary triumph must ever redound to the honour of American medicine.

No excuse is necessary in this section for dwelling a little on the important subject of the prophylaxis of malaria. An epidemic of any kind is among the most costly in life and money that can befall a town or district. An epidemic of malaria differs from other outbreaks of disease in this important fact, that its effects are not limited to the deaths it causes, but

that it often leads to years of suffering, poverty, and

depopulation.

I have high authority for stating that, taking one year with another, malaria destroys twice as many people in India as cholera, small-pox, and all other epidemic diseases put together. It is a matter of history that the same cause almost annihilated the soldiers of the Walcheren expedition, and the army under Wellington in Spain was so assailed by malaria that, according to Ferguson, the enemy and all Europe believed the British forces were exterminated. Malaria stopped the great Panama scheme of de Lesseps. I have known districts in Ceylon almost depopulated. A most disastrous outbreak occurred some years ago at Galle—a town previously malaria free-attended with great loss of life, in consequence of the construction of a railway, the embankments of which were made by excavating pits at the sides that soon were filled with rain-water. In those days the origin of the fever was, of course, attributed to disturbance of soil. We now know the pits provided breeding places for the Anopheles, and the Sinhalese and Tamil labourers from malaria districts supplied the organisms.

Although we were ignorant of the true conditions which caused the outbreak, we advised the filling up of the pits on the disturbance of soil theory with satisfactory results, proving that much can be done in the prevention of disease before full knowledge of causa-

tion is reached.

I will only occupy a few minutes of your time while I describe two experiments—one made by the Colonial Office on Dr. Manson's advice, and the other by the Japanese Government, which clearly show it is both possible and practicable to prevent malarial infection.

In the experiment conducted by Drs. Sambon and Low in the Roman Campagna and in London, in order to prove the truth or error of the mosquito malarial theory, and also how far protection against malaria might be consistent with the ordinary avocations of life, two experiments were necessary—one that healthy persons in London should be bitten by infected mosquitoes from a malarious region, and the second that men should live in an undoubtedly malarious place during the fever season, being protected only from the bites of mosquitoes. Those bitten in London contracted ague. Drs. Sambon and Low and two others lived in a mosquito-proof hut in a most intensely malarious place in Italy, where all the inhabitants suffered from malaria. The four inhabitants of the hut remained perfectly healthy all the time, and, I believe, are so still.

The experiments by the Japanese Government were carried out on the Island of Formosa, and they furnish a most conclusive demonstration of the relations between mosquitoes and malaria. A battalion of soldiers who were completely protected from mosquitoes for one hundred and sixty-one days during the malaria season escaped the disease entirely; whereas, there were 259 cases of malaria in another battalion in the same place and during the same length of time not protected from mosquitoes.

I am sure you will agree with the conclusions of Drs. Sambon and Low that their experiments prove

that mosquitoes only are capable of tramsmitting malarial fever; that protection from their bite implies absolute immunity; and that protection can be easily obtained. If further proof is considered necessary for large bodies of men, it is furnished by the Japanese

experiment.

By a study of the life-history and surroundings of the Anopheles, and by varied and long-continued experiments, Ross has determined the best means of preventing malarial infection. He advised the extermination of the Anopheles, and although this is difficult it is not so difficult as at first sight it appears. These mosquitoes breed in small pools of a certain kind easily recognised and easily dealt with, always close to human habitations, as the females must pass frequently between the pools where they lay their eggs and the houses where they obtain their food. If the Anopheles are found in a house the breeding puddles are close by. The greatest practical points derived from Ross's work are two:—

(1) That the life of the Anopheles is in direct and intimate relation with the annual epidemics of malarial

ever.

(2) That it is only necessary to drain the Anopheles

puddles and not the whole of a malarious district.

I believe the discovery of the malarial parasite, and the investigations into the life-history of the mosquito which conveys it to man, have placed us in the position to suggest measures which, if carried out, would have the effect in an unhealthy district of largely reducing the amount of malarial fever and eventually of exterminating it.

(1) Malarial fevers should be included and notified among infectious diseases, so that precautions could

be taken to prevent their spread.

(2) Persons, especially children, suffering from malaria, primary infections or recurrents, should be isolated and treated with quinine to prevent, as far as possible, the infection of mosquitoes.

(3) Persons infected with malaria should be prevented coming to a healthy place to infect mosquitoes.

(4) The puddles in which the Anopheles breed should be drained and filled up, or treated with kerosine to destroy the larvæ.

(5) Doors and windows of houses, gaols and hospitals in malarious districts should be screened with wire gauze, and beds should be provided with netting to prevent mosquitoes entering and biting the

occupants.

I am painfully aware how far this address falls short of what might have been accomplished by a more skilful handwriting upon the all-important subject of malaria prevention, but my remarks will not be thrown away if they induce those not acquainted with recent work to take an interest in and to appreciate the wonderful results in tropical medicine which have followed on the discovery of the malarial parasite.

Let knowledge grow from more to more, But more of reverence in us dwell; That mind and soul according well, May make one music as before: But Vaster. July 30th, 1902.

Sir William R. Kynsey, President, in the Chair.
DISCUSSION ON BERI-BERI.

I.—Patrick Manson, C.M.G., F.R.S., introduced the subject of beri-beri for discussion, by stating that we should be in agreement as to what the word beri-beri indicates. It has been applied to ankylostomiasis, to epidemic dropsy, to sleeping sickness, and even at the present day it is possible a variety of ailments are erroneously grouped with beri-beri.

As from under the term malaria we are gradually weeding out diseases which have long been falsely associated, so in time beri-beri will be freed from an associated group of ailments with which it has nothing to do. Clinically, beri-beri is a multiple peripheral neuritis. From the etiological standpoint, in the tropics as elsewhere, there are many kinds of peripheral neuritis, which, although different in their causation, have much in common clinically. doubtedly in the tropics we find cases of peripheral neuritis arising from alcohol, from ptomaines of different kinds, from minerals, such as tin and arsenic, and from organic poisons developed in the body in the course of specific infections. Indeed, beri-beri has lately been regarded as mere arsenical poisoning; but without entering into the argument, there are many clinical and epidemiological arguments to show that arsenical neuritis and peripheral neuritis are distinctly different conditions. In regard to malarial neuritis, although rare, it is possible there is such a thing, but the great majority of these affections are really beriberi. Beri-beri may co-exist with malarial parasites in the blood just as it may co-exist with tuberculosis. Dr. Manson quoted examples to prove both. also drew attention to the peculiar loss of memory that appertains to severe malarial infection, and contrasted this with the clear intellectual state of beriberi patients.

#### DISTINGUISHING FEATURES OF BERI-BERI.

From other pathological groups with neuritis as their leading clinical phenomenon beri-beri is distinguished by (1) our ignorance of the cause; (2) its occurrence as an endemic and epidemic disease; (3) its proneness to produce cardiac disability and dropsy; (4) the non-implication of the cranial nerves with the exception of the pneumogastric; (5) the non-implication of the intellectual and emotional centres; (6) the rarity and complete absence of trophic skin lesions; (7) the high rate of mortality under certain conditions.

In considering the etiology of a disease it is convenient to divide the subject into (1) the immediate cause—germ, toxin, inadequate and improper food, traumatism, or whatever it may be; (2) the means by which, or the medium through which, the cause is applied; (3) the circumstances personal to the individual which influence his receptivity and susceptibility; (4) the physical conditions external to the patient, favourable or the reverse, to the application and operation of the cause.

Assuming that we are dealing with only one form of neuritis in what we call beri-beri, I hold that this neuritis is produced by (1) a toxin; (2) the toxin

is the product of a germ operating in some culture medium located outside the human body; (3) the toxin enters the body neither in food nor in water, but through the skin or by inhalation.

The germs which from time to time have been discovered in beri-beri patients have been discredited, and never more completely than by the recent work

of Dr. Stanley, of Shanghai.

That the toxin of beri-beri is produced by a living germ is proved by the fact that the disease can be introduced into virgin countries and there spread. The hypothetical cause is capable of being transported and of multiplying. Spontaneous multiplication is a property peculiar to living things; therefore the originating agent of the toxin of beri-beri is a living

thing—a germ.

The question of infection by rice has held the field of argument for many years. But although disputed by many, it has never been completely refuted until the present moment. Recent papers by Dr. Bolton, of Diégo Garcia, and by Dr. Travers, of Kuala Lumpur, prove this up to the hilt. Dr. Travers' paper marks an epoch in our knowledge of beri-beri, for though his results are entirely of a negative character, they effectually sweep away a mass of crude conjecture, and narrow down very much the field for future investigation.

The inference to be drawn from this conclusive experiment is that beri-beri has no direct, if any, connection with food, most certainly not with rice. He further, however, specifies that "all food" supplied to the beri-beri and non-beri-beri patients was bought, cooked, and distributed from the same sources, and as we know that water has nothing to do with the etiology of beri-beri, it is safe to conclude that neither food nor drinking water play a part in the production

of beri-beri.

II.-E. R. Rost, Captain I.M.S., contributed a

paper on "The Cause of Beri-beri."

During an outbreak of beri-beri in a gaol in India, Captain Rost observed that pigeons living in large numbers under the roofs of the gaol buildings were affected by an epidemic disease which caused paralysis of the wings and death. At this time Captain Rost thought he had traced the disease to a micrococcus which he found in the Jewari—the staple food of the gaol. After preventing the pigeons visiting their home under the roof the epidemic died out. favourable opportunity for investigation arising again in Rangoon, Captain Rost found in rice-water liquor and in mouldy rice an angular diplo-bacillus between the starch granules, and found that this was extremely resistant to high temperature. He found this organism also in the blood and cerebrospinal fluid of a large number of beri-beri cases, and cultivated it in broth, rice-broth and ascitic fluid.

Captain Rost subsequently experimented with the diplo-baccillus he describes, when he found fowls infected with the growth became paralysed and died, and the bacillus was found in their blood and tissues. He also suspects rice as the cause of the disease in man, and attests evidence which he describes "in itself is so remarkably in favour of the rice origin

as to leave little doubt as to the causation of the disease."

III.—L. W. Sambon, M.D., failed to see how Dr. Traver's experiment swept aside the amount of evidence accumulated on rice as a possible factor in the etiology of beri-beri. He did not, of course, think that rice was pathogenic because deficient in mineral and nitrogenous matters, but that rice might be related in some places to beri-beri, as maize is to pellagra, or, in other words, that rice might become the vehicle of the disease by special contamination.

IV.—RONALD Ross, C.B., F.R.S., said he had obtained further analyses of the hair from beri-beri patients, and that of 30 cases examined 10 had exhibited traces of arsenic. It was peculiar, also, that it was only in the most recent cases of the illness that the arsenic was found; in only one old case (five months' standing) was a trace found. Major Ross in no way affirms that beri-beri and arsenic stand to each other as cause and effect, but recent records have suggested the possibility, and the evidence cannot be lightly laid aside.

V.—C. W. Daniels, M.B. (Camb.), stated that trophical peripheral neuritis included other diseases than beri-beri, especially a post-dysenteric peripheral neuritis. It is owing to the inclusion of so many ailments under the description of beri-beri that so many widely different conclusions were arrived at.

VI.—James Cantlie, M.B., remarked that he had seen beri-beri spread in a ward to surgical cases with ulcers, whilst the medical cases escaped. He hoped to find investigations in beri-beri carried out on the same lines as yellow fever had been investigated by the U.S. Army Commission in Cuba.

VII.—W. T. PROUT, M.B., Sierra Leone, said that beri-beri was not endemic in Sierra Leone, but he had seen a ship arrive on the coast from Panama with 250 out of 500 negroes affected by beri-beri. The negroes were landed and properly cared for. Only nine of them died, and the disease did not spread beyond the confines of the beri-beri camp.

VIII.—P. A. NIGHTINGALE, M.D., stated that beriberi was not an endemic in Bangkok, and that outbreaks of the disease were very rare. He had, however, 18 months ago, seen a sharp epidemic of beri-beri at Bangkok.

IX.—Sir WILLIAM KYNSEY said that although beriberi was considered to prevail at one time in Ceylon, he had never seen a case in residents or natives of the island; all the cases he saw were importations. He would like to have more definite information as to the popular tale of the consumption of arsenic by Styrian peasants.

Other papers read were: -

(1) The Climate and Diseases of Bangkok, by P. A. Nightingale, M.D., Harrogate.

(2) Enteric Fever in Sierra Leone, by Major F.

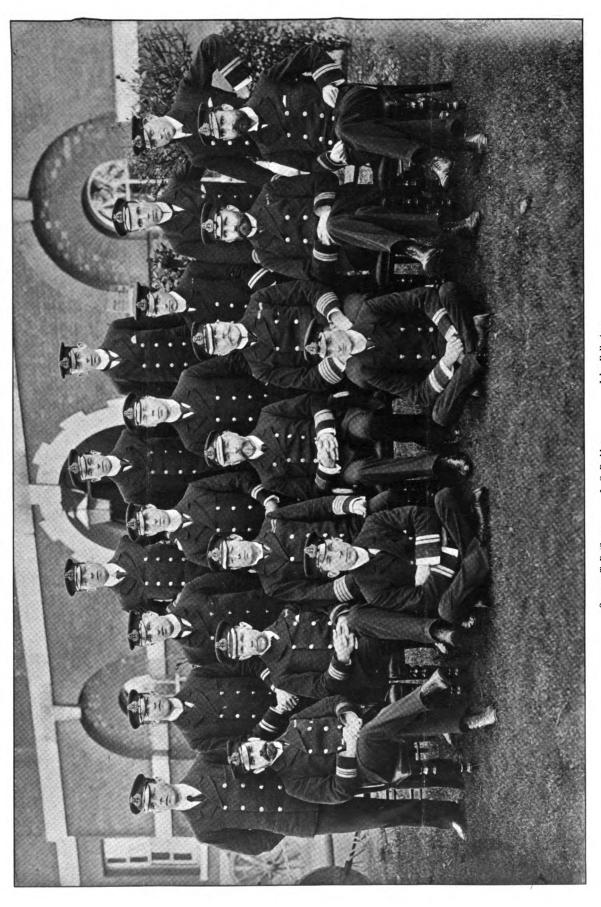
Smith, R.A.M.C.

(3) Dysentery, by Andrew Duncan, M.D., F.R.C.S., F.R.C.P.

(4) The Prevention and Treatment of Dysentery in Institutions in the Tropics, by W. T. Buchanan, Major I.M.S.

<sup>&</sup>lt;sup>1</sup> Dr. Travers' paper will be found at p. 231 of this issue of the Journal.

# STAFF OF HASLAR HOSPITAL AND JUNIOR OFFICERS ATTENDING THE COURSE OF INSTRUCTION DURING THE TERM ENDING JUNE 20th, 1902.



Surgeon E. S. Miller Surgeon T. W. Myles Staff Surgeon P. W. Bassett-Smith

Surgeon T. B. Shaw L. G. Peebles John Fullarton Surgeon Oswald Mills\* Surgeon E. I., Thomas Surgeon A. K. Smith-Shand Surgeon N. H. Mummery Surgeon W. B. Maurice Surgeon F. A. Capps

Surgeon Leslie M. Morrist

Surgeon W. L. Cherry \* Gold Medallist in Naval Hygiene, Histology, and Tropical Diseases.

+ Silver Medallist in Naval and General Hygiene.

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(5) Tropical and Amabic Abscess of the Liver, and its Relationship to Amabic Dysentery, by Leonard Rogers,

(6) Sanitary Work in West Africa, by M. Logan

Taylor, M.B., Ch.B.

(7) Bilharzia hæmatobia in Cyprus, by G. A. Williamson, M.D.

(8) Yellow Fever, by James Cantlie, M.B.

(9) The Differential Diagnosis of Yellow Fever and

Malignant Malaria, by G. C. Low, M.B.

(10) The Agglutinating Properties in the Blood in Cases of Mediterranean Fever, with Special Regard to Prognosis; Remarks on other Blood Changes and Reactions during the Course of the Disease, by P. W. Bassett-Smith, Staff-Surgeon R.N.

(11) The Geographical Distribution of Malta Fever and the Value of Splenic Enlargement as a Test of Malarial Incidence, by James A. Hislop, L.R.C.P.,

L.R.C.S., Assam.

(12) Kala-azar, as an Analogous Disease to Malta

Fever, by C. A. Bentley, M.B., C.M., Assam.

 (13) Heat Apoplexy, by Edward Henderson, M.D.
 (14) The Prophylaxis of Sunstroke, by Andrew Duncan, M.D., F.R.C.P., F.R.C.S.

(15) Contributution to the Study of the Bacillus

pestis, by Professor Galli-Valerio, Lausanne.

(16) Remarks concerning the Nomenclature, Etiology and Prophylaxis of the Intermittent Fevers, by L. W. Sambon, M.D.

(17) Malarial Fever in Cyprus, by G. A. William-

son, M.D.

- (18) Filariasis in Sierra Leone, by W. T. Prout, M.B.
- (19) Malta Fever in the Canaries, by Brian Melland, M.D.
- (20) The Leucocytes in Malaria, by Charles Melland, M.D., M.R.C.P.
- (21) A Trypanosome in Man, by J. E. Dutton,

#### THE LIVERPOOL SCHOOL OF TROPICAL MEDICINE.

SIR ALFRED JONES, K.C.M.G., Chairman of the School, entertained at dinner at the Adelphi Hotel, Liverpool, on August 1st, 1902, His Grace the Duke of Northumberland, K.G., and the members of the Tropical Diseases Section of the British Medical Association. Amongst those present were: The Bishop of Liverpool; Sir Wm. MacGregor, K.C.M.G.; Sir George Denton, K.C.M.G.; C. McArthur, M.P.; Professor Clifford Allbutt, F.R.S.; Sir William Banks, F.R.C.S.; Hon. James Boyle, U.S.A. Consul; Professor John Chiene, C.B., F.R.S.; Professor Carter, F.R.C.P.; Professor Boyce, F.R.S.; Professor Stoeltzner; Mr. Rushton Parker, F.R.C.S.; and Dr. Grunbaum. The Members of the Section of Tropical Diseases present were: Sir William Kynsey, C.M.G.; Dr. Patrick Manson, C.M.G., F.R.S.; Major Ronald Ross, C.B., F.R.S.; Professor Sandwith, F.R.C.P., of Cairo; Professor Madden, F.R.C.S., of Cairo; Dr. W. T. Prout, of Sierra Leone; Dr. J. E. Dutton; Dr. C. W. Daniels, M.B.; and Mr. James Cantlie, F.R.C.S. The toast list was as follows: "The King," proposed

by the Chairman; "The Duke of Northumberland," proposed by the Chairman; "Tropical Medicine, proposed by the Lord Bishop of Liverpool, responded to by Sir William Kynsey, C.M.G.; Dr. Patrick Manson, C.M.G.; and Professor Clifford Allbutt, F.R.S.; "Our Tropical Colonies," proposed by the Chairman, responded to by His Excellency Sir William Mac-Gregor, K.C.M.G., Governor of Lagos; His Excellency Sir G. C. Denton, K.C.M.G., Governor of the Gambia; and John Holt, Esq.; "The Chairman," proposed by Mr. C. McArthur, M.P.

Over one hundred guests sat down to dinner, and a most enjoyable evening was spent. The toast of "The Chairman" was ably given by Mr. McArthur, and most cordially received by the company.

## Translation.

LOMADERA, A SPECIES OF EXCEED-INGLY WIDESPREAD TEXAS FEVER IN VENEZUELA.

> By Dr. Hans Ziemann, Naval Staff Surgeon. (Translated from the German by P. Falcke.)

In the following article I report a few results of investigations on a cattle disease in Venezuela during my stay in that country whilst serving with H.M.S. " Moltke." My stay lasted from November 28th to December 15th, 1901, during which time I visited the more important places on the coast, and went by rail from La Guayra through the mountains to Caracas, then to La Victoria, and from Porto Cabello again I went as far as Valencia.

The cattle disease, the cause of which in these places was quite unknown and which was called "lomadera," or "ringadera" plague, is, it may be taken for granted, either "Texas fever" or a disease analogous to it. In 1897 I discovered a new centre of this disease in Northern Italy, and by means of my special method of staining the bacterium of the disease1 I even at that time felt fully convinced that this disease, which is so fatal to cattle, must have a far larger region of distribution.2

On the present voyage, therefore, all my endeavours were fixed on gaining more material respecting this blood disease which in many particulars so nearly

resembles malaria.

Incidentally, during the investigations, an extraordinary dissemination of distomum hepaticum was found to be present in the adult oxen on the islands off Cape Verdi; on the other hand, ticks-ixodidæwhich in actual Texas fever transmit the disease were conspicuous by their absence. However, during the course of a walk from La Guayra to Macuto, I came across a herd, the oxen of which were all infested by

<sup>1</sup> Ziemann, Neue Untersuchungen über die Malaria und den Malariaerregern nahestehende Blutparasiten. Deutsche medizinische Wochenschrift, 1898.

<sup>&</sup>lt;sup>2</sup> In regard to my discoveries in Germany compare H. Ziemann, Ueber das endemische Vorkommen der seuchenhaften Hämo-globinurie der Rinder in Deutschland. Deutsche medizinische Wochenschrift, 1901, No. 21.

In Germany I only found ixodes reduvius on the cattle in the infected districts, but these ticks appeared to be identical with ixodes australis. It is evident that this nomenclature requires correction.

#### TEXAS FEVER PREVALENT IN VENEZUELA.

The investigations conducted in La Guayra, in the abattoir of Caracas, on the pastures near Valencia, and in the Hinterland of Porto Cabello, and even on board ship on an infected calf taken with us, led to the following astonishing result. That seemingly a large percentage of the native Venezuelan cattle suffer from "Texas fever" and that nearly all the imported cattle succumb to this fatal disease. This observation should be of scientific and practical interest. The classical investigations of the Americans, Theobald Smith and Kilborne, have revealed the fact that an area of distribution of Texas fever exists in the south of the United States, where even at the present day it does damage to the amount of £4,000,000 per annum; moreover, the investigations of Lignières have confirmed a second centre of distribution in the Argentine. By my discoveries those two centres of disease separated by large tracts of country are brought into closer local connection. The everlasting revolutions in these fertile countries have rendered scientific enquiry a matter of difficulty. A wealth of material awaits the investigator provided with modern appliances; for yellow fever, small-pox, malaria in its severest forms, blackwater fever, leprosy and the most interesting skin diseases are found; and in parts also, beri-beri, anchylostomum and filarial disease prevail, varying in frequency according to the locality. Thus, I was surprised to hear that blackwater fever is relatively frequent on the Orinoco. A few observa-tions on this subject will be found elsewhere. In regard to the diseases of animals the countries mentioned are as yet terra incognita.

#### THE DISTRICTS INFECTED.

Venezuela was formerly not a country from which cattle was exported. The export of coffee and cocoa, and sugar in a less degree, were the sources of its prosperity. Since the culture of coffee has decreased through the considerable fall in its price, and impoverishment has further increased through the political conditions that prevail, more attention has been given to the breeding of cattle as a means of revenue. Porto Cabello and Guanta Barcelona are the export harbours for cattle; St. Jago de Cuba, Habana in Cuba, and Trinidad are the principal ports of destination of the cattle. The breeding of the cattle takes place inland on the immense high pasture lands, where the so-called guinea and gamelote grasses provide the animals with abundant food. In the west and south these pastures are bordered by enormous primeval forests watered by the tributaries of the Orinoco. In order to reach the sea-shore the herds must cross the fairly steep mountains to reach La Victoria and Valencia. I also saw fairly large pastures near Valencia and Lake Valencia. forests on the mountains near the coast have all been burnt down, and the mountains now are but scantily wooded. The partial scarcity of water in the country is certainly attributable to this circumstance; as an instance I heard that in Cumana there is sometimes

no rainfall for three years. The actual dry season in the pasture land lasts from November to May. During February, March and April the cattle are not driven to the coast; the reason for this, as explained to me, was that during these months the cattle could not find enough food en route during their journey. June, July and August are the principal months for export, and in a less degree December, January and February. The railway is but little used for bringing the beasts to the coasts, as they always arrive in bad condition after the railway journey. It is customary to drive the cattle to the above-mentioned pastures near Valencia, which are mostly the property of the large exporters.

The minimum length of this journey is computed as being equivalent to a fourteen hours ride on horse

back.

The cattle remain on these pastures for three or four weeks, sometimes for two or three months, to be fattened, and then are driven to the coast in two or three days, where they are left a day or so and then conveyed to Cuba by steamer. In Cuba the purchasers send them to grass for another two or three months before being killed. The cattle from the interior mostly reach the coast in a more or less deplorable condition, dependent largely upon the barbarity of the drivers and the scarcity of food on the way. I myself saw freshly arrived oxen in Caracas which were scarcely able to crawl owing to sore hoofs. The animals that have already acquired the germs of disease often die during this fatiguing journey, so that a sort of natural selection has taken place amongst the cattle that reach the coast.

#### SIGNS AND SYMPTOMS OF LOMADERA.

It is particularly during the dry season that oxen—and it is said horses also—are attacked on the high pasture lands by a disease that mostly has a fatal termination. It is manifested first of all by languor, the sorry appearance of the animals, diarrhea and disinclination for food. The symptoms may prevail a few days, whereupon hæmaturia sets in and the conjunctive become yellow. It was not possible for me to ascertain if a rise of temperature occured, though it may be concluded that such was the case; it is improbable, also, that the temperature of a sick beast was ever taken in Venezuela. Often during the illness the milk and fæces were tinged with blood. The animals almost always perish from exhaustion. The duration of the illness fluctuates between a few hours and a few days; it is only rarely that the disease drags on for a fortnight.

#### POST-MORTEM APPEARANCE.

The principal changes observed in the cadavers as noted by me in the slaughter-yard in Caracas in animals that were seemingly healthy but in reality diseased, were as follows: The muscles are very pale and anæmic, the entire subcutaneous cellular and adipose tissues are tinged yellow, the kidneys present a condition of parenchymatous inflammation, the liver and spleen are enlarged, the gall bladder distended with bile, the bile ducts in the liver dilated and also full of bile. In one case also small punctiform extravasations of blood were observable in the intestine. In streak preparations, particularly from

the heart, kidneys and spleen, the blood parasite—the pyrosoma bigeminum to be mentioned below-was observable in great profusion. The shortness of the time at my disposal, the remarkable want of interest displayed by these southern people in the well-being of their cattle, as well as the fact that the cattle observed by me had passed through the hands of several drovers, all rendered the task I had in hand difficult; and it was impossible to ascertain whether the cattle could be attacked twice or thrice by the disease, and whether steers and oxen, or calves or cows are most liable. One fact appeared certainly to be known to all the drovers, namely, that the best and heaviest cows were most liable to be most severely attacked. I ascertained that in this country the cows only exceptionally yield 12 to 15 litres of milk per diem; the average yield is 1 to 2 or 3 litres.

#### ETIOLOGY.

The cause of lomadera, according to the local popular opinion, is that the heat and the direct rays of the sun combined with scarcity of food and water originated the disease. When an animal died it was at once buried. The pasture was then burned down and the cattle

driven to another pasture.

Remedies seemingly were not applied. It is noteworthy that the ticks are not brought into etiological connection with lomadera. Only so much was known, that a beast beset with many ticks became "sad." succeeded, however, in confirming the fact, first, that the most extensive appearance of lomadera was contemporaneous with the enormous number of ticks that appeared in the dry season, and that the ticks, even in the coast regions, at least as regards La Guayra and Porto Cabello, are present in the underwood in great numbers. At every step through the undergrowth the female ticks may be found clinging to one's arms and legs. On the pastures of a Mr. Ermen, in Valencia, I saw young calves that had been born there covered with Indeed, nearly all the cattle in Venezuela were, according to my observations covered with ticks, and almost always to a much greater extent than the cattle with hæmaturia in Germany. drove of 800 at Valencia not one animal seemed free. All details, including the experiments with ticks taken off seemingly healthy and sick cattle will be reported on in a book I intend publishing on hæmaturia of cattle in Germany. As to this disease, which is considerably less destructive than lomadera, it may be mentioned that there are essential differences between the two diseases.

# THE PARASITES OF TEXAS FEVER AND LOMADERA COMPARED.

The exciting factor in lomadera, as found in the red blood corpuscles, are minute light bodies possessing unusually lively local movement with a diameter of from  $\frac{3}{4}$  to  $1~\mu$ . When grown larger they become roundish formations with amœboid movement; the larger, however, they grow the less motile do they become; they also become paler. The largest size of these roundish parasites observed by me averaged 2.5 to  $3.0~\mu$  in diameter. The motility of the small parasites within the red blood corpuscles was maintained for an uncommonly long time—for about five or six hours in cover-glass preparations, and as long as eight days

in red blood corpuscles in the contents of the stomach of ticks taken off a sick beast. Very frequently from two to six of the smallest parasites were present in one red blood corpuscle, sometimes also two larger round ones. It was not uncommon to observe one larger parasite to which one or two smaller ones were attached as if just segmenting. Often, also, annular forms were observed which microscopically were hardly distinguishable from the well-known annular forms of

the tropical malaria parasites.

In one calf, that was permanently under observation, pear-shaped parasites also appeared, mostly two in each blood corpuscle in such a position that the two pointed extremities touched. The two together occupied about two-fifths of the capacity of the infected red blood corpuscle; they were therefore mostly larger than the corresponding forms in Germany. These pyriform bodies in Venezuela were also immobile. I cannot now enter into the question of the multiplication of the parasites. The details of the structure of this interesting parasite, as ascertained by the method of staining described by me elsewhere, entirely correspond with the description first given by me1 of the parasites of Texas fever, and which was fully confirmed by other authors. The parasites consist of a small heap of chromatin, representing the nucleus surrounded by a light area and the protoplasm. When anæmia has set in in consequence of the disintegration of the numerous infected red blood corpuscles, or the toxic effects of the parasites, it is possible in lomadera also to observe basophile granules in numerous non-infected red blood corpuscles. As, however, Theobald Smith has demonstrated, the granules thus stained with basic colouring matter have nothing to do with the parasites.

It is interesting to note that of four cattle taken for examination haphazard in La Guayra, and which had been driven to the coast from the interior a week previously, three exhibited a considerable infection of the blood with small round parasites. The animals which were not thinner than the average, did not exhibit the slightest sign of ill-health. One was an exceedingly lively steer. All were very much infested by ticks. Of two seemingly healthy cows in Valencia infested by ticks, one likewise exhibited infection with small round parasites, as did also a calf seven days old, born there and very strong; so also did a calf born in Valencia, twenty days old. The latter, certainly, looked very miserable after having lost its mother, but was otherwise healthy; as the infection was very considerable it was taken on board for further experiment. On the following day it was taken with typical hæmaturia, probably as an indirect consequence of its railway journey and change of food (feeding by bottle), and after nine days it died, and

an autopsy made.

From the above observations it appears to me that the practical conclusion come to is that first of all lomadera occurs not only on the high inland pastures but also in the districts nearer the coast, and that seemingly healthy cattle of this district may be the

<sup>&</sup>lt;sup>1</sup> H. Ziemann—Ueber Malaria u. andere Blutparasiten, nebst Anhang eine wirksame Methode der Chromatin und Blutfärbung, Jena. G. Fischer.

bearers and transmitters of this disease. According to the assertion of the various drovers, lomadera is supposed not to occur at all at the localities I observed. to wit Valencia; at the season of my visit, however, the disease did prevail there, but it exhibited no visible symptoms. It may at once be gathered what importance this circumstance has for export or rather for the export harbours. According to my investigations in Germany, pyrosoma bigeminum is not capable of transmission from the mother (intra-uterine) to the calves, but my observations on the seven-days-old calf prove that infection in Venezuela can already take place within seven days. It is my firm conviction that the remarkable paucity of the milk of cows in Venezuela is due only to latent infection with lomadera. It is to be hoped that in more peaceful times a wise law, similar to the one obtaining in the United States, will place a check on this plague. It is even feasible at present by destruction of the ticks to make it possible to import better strains of cattle for the improvement of the native cattle, an experiment in this direction having been formerly made and relinquished on account of its costliness. I may here mention that I succeeded in Germany in procuring an exceedingly light infection in a series of sucking calves by means of inoculation of virulent blood, which afforded a high degree of protection against the subsequent natural infection.

In conclusion I will add a few words on lomadera of horses in Venezuela. Unfortunately, I was unable personally to observe a case. According, however, to descriptions of the disease, its course is still more rapid and more frequently fatal than in horned cattle. Clinically it appeared to correspond fairly well with the so-called "Kreuzrhehe" of horses in Germany. It may therefore be mentioned in this connection that I examined a horse in Oldenburg that had a slight attack of "Kreuzrhehe" accompanied by hæmaturia, and in examining the blood I discovered small parasites with lively movements, which exhibited no difference from the adolescent forms of the parasites of the hamaturia of cattle. Unfortunately, I was unable to demonstrate my opinion that the "Kreuzrhehe" of horses is an infectious disease by inoculation of the blood of the sick horse into a healthy one.

Addendum -On St. Thomas, a Danish island of the West Indies, I also found that Texas fever was present, though not considerable; so that the regions of infection of the United States and Argentine receive another connecting link. According to accounts received, a disease similar to the Texas fever of horned cattle seems to prevail amongst the sheep on St. Thomas; this, perhaps, corresponds with the carceag of sheep described by Babes as occurring in Roumania.

In April, 1902, I succeeded in experimentally demonstrating that larvæ which I had myself bred from the ova of the ixodes (australis), brought by me to Europe, originated "lomadera" in a healthy German calf from an immune district within seven days. The larvæ grew into the adult state on the calf. I was unable to demonstrate this experiment with ixodus reduvius.

The tick in question has proved to be Rhipicephalus annulatus (Say), Boophilus bovis (Riley).—(Deutsche Medizinische Wochenschrift, 1902, Nos. 20 and 21.)

QUESTIONS CIRCULATED BY DR. A. VALAS-SOPOULO CONCERNING THE "TYPHUS BILIEUX" OF EGYPT.

Sir,—Having been deputed by the first Egyptian Congress to make a report on "typhus bilieux," a disease that is endemic in Alexandria, I venture to submit the following list of questions to you, and shall be obliged if you will send me the answers thereto.

I remain, &c., &c., Dr. A. Valassopoulo, Physician-in-Chief to the Greek Alexandria Hospital.

QUESTIONS.

1. Have you observed any cases of "typhus bilieux" in the town you practise in?

2. Were they sporadic cases, or circumscribed outbreaks?

3. At which season of the year did they take place?

4. What were the predominating symptoms? (a) On which day of disease did jaundice appear?

(b) Was the albumen in the urine abundant, and did this phenomenon appear early?

(c) Did the course of the fever and the nerve symptoms remind you of a "typhique" illness?

(d) Were the stools discoloured?

(e) Did your patients exhibit marked myalgia during the first day, and which group of muscles were most involved?

(f) Did your patients exhibit cardiac symptoms,

and at what period of the disease?

(g) Have you made a special study of the urinary symptoms in this disease?

(h) Have you observed an urinary crisis at the

close? Have you observed relapses?

5. What was the mortality? What was the immediate cause of death (syncope or uræmia)? At what

period of the disease did death supervene

6. Have you noted any particulars as to the etiology, the pathogeny, the diagnosis, and the treatment of "typhus bilieux"? Have you observed cases of contagion in the family of patients, or facts that would lead you to suspect transmissibility of the disease, direct or indirect? What is your opinion on this question? Have you examined your patient's blood for Obermaïer's spirochæte?

7. Have you observed cases of "typhus hepatique benin" or relapsing "ictere febrile"? The disease studied by Albert Mathieu, in Paris, and by A. Weil, which is called "Weil's disease in in Berlin,

Europe"?

8. Do you believe there is identity between Weil's disease, "l'ictère infectieux," benign or severe, and the Egyptian "typhus bilieux," as described by Griesinger?

9. Have you observed any etiological connection between defective drainage of sewers and the disease

under consideration?

10. What is your opinion on the pathogeny of the disease? Is it primarily a general disease with consecutive hepatic localisation, or is it an infectious malady of the biliary passages with subsequent general phenomena? What, according to your observations, is the order of the various symptoms (icterus, cardiac symptoms, renal symptoms, &c.)?

I shall be very grateful to all medical colleagues who will communicate their ideas on the above

subject to me.

[We have thought it advisable to allow the nomenclature employed in the original French to remain. At the same time we believe "typhus bilieux" to be the equivalent of the English term "biliary typhoid."—ED. J. T. M.]

## Hews and Aotes.

To relieve Pruritus Ani.—Heat applied to the anus or to other parts of the body affected by pruritus in either a dry or moist form is efficacious in procuring relief. Bathing with very hot water may be the only means at hand; if so, it will be found that water at a temperature of 125° F. is usually capable of being borne for a short time.

Dr. Edmund Andrews of Chicago employs a metal suppository for introduction into the anus for a couple of inches through which hot water circulates, thereby

bringing dry heat to bear on the itching part.

Malaria at Ismailia, Egypt.—The President of the Suez Canal Company has requested the Liverpool School of Tropical Medicine to send Major Ronald Ross, C.B., F.R.S., to Ismailia, to combat malaria there. Sir Alfred Jones, the Chairman of the school, has agreed to do so, and it is proposed that Major Ross proceed to Ismailia in September.

CANCER RESEARCH.— The Executive Committee appointed to control the fund collected for the purpose of conducting research into the true causes and cure of cancer, consists of Sir W. Broadbent, Sir W. Church, Sir H. Howse, Drs. Sydney Martin, Pyesmith and Rose Bradford, Professor Sims Woodhead, and Messrs. Langton, Henry Morris, Butlin, McFadyean, and Watson Cheyne.

The fund available at the moment amounts to

£32,391.

We would urge upon medical practitioners in the tropics to forward their experiences concerning cancer amongst native races, and we propose to issue a schedule to facilitate reports on this important subject.

# Current Miterature.

Two Cases of the Pink Variety of Mycetoma. By Frank Cole Madden, M.B., F.R.C.S. Senior Surgeon to the Hospital.

(Reprinted from the "Records of the Egyptian Government School of Medicine," 1901.)

Since the pathology of madura foot was first placed upon a scientific basis by the investigations of Vandyke Carter, cases of this disease have been described in so many tropical countries that the original idea, that the condition was indigenous to certain districts of India, has gradually been abandoned. Two cases appearing within a year seem to indicate that myce-

toma is not altogether rare in Egypt, and the occurrence of the unusual pink variety of the fungus makes

these especially interesting.

A good deal of the pathological obscurity has been removed by many excellent series of cultivation experiments, but still much remains to be done to determine the exact relationship of mycetoma to its more familiar kinsman, actinomycosis. Then, too, the cause of the variation in colour of the mycotic granules, without any marked clinical differences, has still to be explained.

1.-A CASE OF MYCETOMA OF THE RIGHT FOOT.

The patient was a healthy young man, a native of the Soudan, with a very black skin. He described his condition as starting two years ago as a small, hard lump under the ball of the great toe; this lump gradually increased in size, and burst, leaving a small discharging sinus. Similar lumps began to appear on the dorsum of the foot, over the instep, and on the inner side of the sole. The foot gradually enlarged in size in all dimensions, and he had more and more difficulty in walking owing to the increasing pain and weight of the foot. He had a good deal of pain throughout, and for a month prior to admission to hospital, in October, 1898, he had been quite unable to walk. The foot presented all the usual characteristics of a madura foot, and was associated with marked wasting of the muscles of the limb, especially below the knee. On closer inspection of the discharge, with which the innumerable sinuses were tipped, fine carmine-coloured grains were seen sprinkled, as it were, upon the peculiar purulent material which was exuding. Microscopically, these grains were distinctly pink in colour, and under the low power appeared as star-shaped amorphous masses. Dr. Bitter subsequently confirmed the diagnosis of mycetoma microscopically.

As the pain continued severe the patient readily gave his consent to amputation, which was performed by lateral skin flaps in the middle of the leg. The cut surfaces of the bones appeared to be quite free

from any mycotic infection.

On cutting into the specimen the bones of the foot were found to be in a condition of gelatinous degeneration, and were hardly distinguishable from the surrounding soft tissue. The rest of the foot consisted of soft, fibrous-looking tissue, and the whole cut surface was scattered throughout with very minute carmine-coloured grains. Even now, when a fresh section is cut, the grains are still bright in colour and widely distributed throughout the section. The general appearance of the specimen did not at all correspond with that of an ordinary madura foot of the white or yellow variety, the absence of cavitation being especially marked.

2.—A Case of Mycetoma of the Upper Part of the Thigh.

This man was also a Soudanese, aged 35, born in Darfur. He was living at Kassala when the first symptoms developed a year ago. He noticed a small localised swelling high up on the inner side of the right thigh. This gradually increased in size and extended outwards, its progress being marked by some pricking pain. Three months ago the swelling burst

and discharged a fluid like blood by numerous small openings, a small vesicle forming first at the side of each sinus. The number of openings of this surface of the leg gradually increased, and the whole limb became swollen. The pain has been persistent throughout, though never very severe, and the swelling and cedema became very marked after much walking.

On examination there is a general swelling of the right leg with a well-marked thickening around the upper part of the thigh. Just below Poupart's ligament, extending across nearly the whole anterior surface of the thigh and about a handsbreadth in depth, is the diseased area which forms a distinct elevation above the general swelling. Scattered throughout the area are numerous mammillated tubercles each pierced by a small sinus. Most of the openings are capped by dark red grains, while others are discharging a fluid which is thick with pinkish-brown (terracotta) granules. A probe can be passed for some distance into these sinuses and provokes some venous oozing and a profuse discharge of granules. is considerable edema all round the area, extending up on to the abdomen and down to the knee, but there is no tenderness. Some deep glands can be felt in the right iliac fossa, though the disease does not appear to extend on to the skin of the abdominal wall.

After remaining in statu quo for nearly a month a large abscess formed in the abdominal wall and another smaller one in the thigh. At the operation which necessarily followed incisions were made into these abscesses and a lot of blood-stained purulent material was evacuated. The upper abscess communicated with a cavity underlying the sinus area. An incision was then made through the mass of growth and a large quantity of dirty fleshy tissue was removed with a sharp spoon. The anterior crural nerve was laid bare and masses of growth surrounded the great vessels and extended between the muscles in this region. A piece of a large nerve which had been eaten into and destroyed by the growth was found among the debris, which consisted mainly of lumps of sarcoma-like tissue. The cavities were drained and plugged, but very soon further large abscesses formed all down the thigh, and a few weeks later the man died rather suddenly, probably from septic absorption.

A post-mortem examination was made by Dr. Symmers, who found "in the right groin numerous fistulous openings communicating with an extensive subcutaneous cavity which was greenish-black in colour and showed points of blue pus and numerous red points of the red form of mycetoma. The bone was unaffected, and the mycetoma seemed to have limited its destructive effect to the skin, subcutaneous areolar tissue, and intermuscular connective tissue, leaving bone and muscles quite free." These postmortem notes are interesting as showing the rather extraordinary local destruction by the mycetoma. One would have expected to find a much more extensive disintegration of the underlying structures after such a long history.

[Note.—I had expected to include an account of the pathological and microscopical characteristics of these cases by Dr. Bitter, but unfortunately he has not had time to complete his investigations.

#### PLAGUE.

#### PREVALENCE OF THE DISEASE.

India.—During the two weeks ending June 28th and July 5th, the number of deaths from plague in India numbered 1,684 and 1,058 respectively.

During the two weeks in question the deaths from plague in the Punjab numbered 1,026 during the former week and but 110 during the latter.

In Bombay city, during the two weeks, the number of plague deaths amounted to 48 and 29 respectively.

During the week ending July 5th, the deaths from plague in the Bombay Presidency numbered 565; in Mysore State 178; in Karachi, 43.

In Port Elizabeth, during the weeks ending June 28th and July 5th, the fresh cases of plague numbered 2 and 2, and the deaths from the disease 4 and 2 respectively.

EGYPT.—During the two weeks ending July 13th and July 20th, the fresh cases of plague in Egypt numbered 9 and 15, and the deaths from the disease 6 and 7 respectively. The majority of cases occurred in Alexandria; but at Samalout, Toukh and Damanhour isolated cases have been reported.

Hong Kong.—During the week ending July 12th, 28 fresh cases of plague and 27 deaths from the disease occurred in Hong Kong, and during the week ending July 19th, 21 fresh cases and 20 deaths.

ODESSA.—Up to July 29th, 7 cases of plague have occurred in Odessa, with 1 death from the disease.

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- 1.-Manuscripts sent in cannot be returned.
- 2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
- 3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.
- 4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Editors.
- 5.—Correspondents should look for replies under the heading "Answers to Correspondents."

# The Journal of Tropical Medicine.

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## Original Communications.

#### FILARIASIS AMONGST THE BAGANDA.

By J. Howard Cook, M.S., M.B.(Lond.), F.R.C.S.(Eng.) [A map of Uganda will be found in the JOURNAL OF TROPICAL MEDICINE, Oct. 1, 1901.—ED.]

C.M.S. Mengo, Uganda Protectorate. June 27, 1902.

To the Editor of the Journal of Tropical Medicine.

DEAR SIR,—I venture to send you for publication a brief paper on the question of filariasis amongst the Baganda. Many of us have been watching with keen interest, and not a little apprehension, the spread of the terrible malady of sleeping sickness in this Protectorate. The first cases that we saw were reported in the JOURNAL OF TROPICAL MEDICINE for July 15th, 1901. They were seen here in February, 1901. Since that time only sixteen months have elapsed, and now we hear that 10,000 deaths have occurred from this disease. Previous to February, 1901, I never saw a case of Filaria perstans amongst the Baganda, though I have examined the blood of very many natives both in films and in the fresh. My present investigations show that 55 per cent. of the natives around Mengo show the filaria in their blood. Do not these figures speak for themselves as to the fatal rapidity of the spread of this incurable disease? I have made an attempt to show on what ground I consider that Filaria perstans is connected with sleeping sickness. The numbers of people examined (235) is too small to dogmatise upon, and my conjectures may be wrong, but I think any contribution on so important a question ought to be made public, if only to be substantiated or overthrown by more competent observers. We have hailed with great delight the news that a commission of scientific men is to come out to Uganda to investigate the question, and we wish them every success.

I remain Sir, Yours faithfully, J. HOWARD COOK.

THE accompanying statistics represent the result of investigations carried on amongst the Baganda around Mengo with a view to determining the percentage of the inhabitants whose blood is infected with the embryonic form of Filaria perstans. A more

limited number of Europeans have also been examined. Lack of time has prevented the examination of larger numbers, and though a statistic built up on the examination of small numbers is misleading, it is hoped that taken in conjunction with similar investigations of other men, it may help towards contributing a useful series of data from which more important deductions may be drawn. An attempt is also made to show how far filariasis, per se, contributes clinically detectable symptoms and signs.

Four classes have been examined, members of each class living under more or less similar hygienic

conditions.

Class A .- Patients or their friends attending the Out-Patient Department of the Mengo Hospital. These are people all belonging to the "Mukopi" or peasant class. They live in small, round grass houses like beehives, with only a small door and no windows, situated in the midst of the banana plantations. Their food is almost entirely mashed plantain. clothing for the most part is a simple barkcloth. eat out of a common dish, but are most particular about washing their hands before and after food. The food is always well boiled, usually for at least an They sleep often on the ground, and many inmates may be crowded into a small house. For the most part these people were either suffering from minor ailments, coughs, colds, ulcers, &c., or had nothing the matter with them, having only come to fetch medicine. One hundred were selected quite indiscriminately, the only question asked being if they lived in the immediate neighbourhood of the Capital.

Class B. - In-Patients in the Mengo Hospital. These may be taken to represent people who have serious intercurrent disease, or who have undergone surgical operations of the graver type. In each case their disease or operation is indicated, as allowance must be made in the symptomatology for symptoms due to the intercurrent affection, and not referable to the filariasis. Fifty of this class have been

examined.

Class C. - Chiefs, boys, girls and women, serving Europeans. These have been included in a separate class, as they live in better houses-more of the European type-feed on more European food, are better clothed, and less herded together. Seventy of this class were examined.

Class D. — Europeans. Fifteen only have been examined.

#### METHOD OF INVESTIGATION.

In almost every case at least two preparations of freshly-drawn blood were examined. Slides and coverslips having previously been cleaned with water and absolute alcohol, and the patient's finger-tip having been cleansed with soap and water and then absolute alcohol, a large drop of blood was transferred to a cover-slip, which was then inverted on the slide in the usual way; a second charged cover-slip was then placed by the side of the first on the same slide, and in some cases a third, the finger being wiped dry between the squeezing out of consecutive drops. In this way it was possible rapidly to search two or three preparations on the same slide. A two-third-inch objective was used, and the whole drop of blood carefully and systematically searched in parallel meridia, and the number of filariæ met with in each preparation noted. All the investigations were conducted between 9 a.m. and 6 p.m. This fact and the observed locomotion of the filariæ was taken as working evidence that they were Filaria perstans, but actual measurements of the worms was not undertaken from want of apparatus. In many of the cases dried and stained films of the blood were examined by the simple fuchsin method recommended by Manson. But it was noted that the latter method, though so simple and convenient, was not so delicate a test of the presence of filariæ as the examination of freshlyprepared drops of blood, where the filariæ were present in only small quantities, possibly for no other reason than that the movement of the filaria at once arrests attention, and a larger surface has to be searched in scrutinising the films.

In addition to examination of the blood, and prior to it, every person was questioned as to the presence or absence of several of the more commonly occurring symptoms or signs of the earlier stages of sleeping sickness, none of which are, of course, diagnostic of the disease, but all of which, if present, form a suspicious and suggestive clinical picture, whereby one may apprehend the onset, threatened or actual, of the disease. These symptoms have been arranged in parallel columns, a plus sign indicating the presence and a minus sign the absence of the symptom in question. Leading questions were, as far as possible, avoided, or ascertained from the patient's friends. The

symptoms and signs sought for were as follows:—
(1) Tremor of Tongue.—A fairly constant sign in early stages of sleeping sickness, in my experience, but of course not confined to that condition. In later stages it is accompanied by tremors of lips and other acial muscles, and later still of the skeletal muscles. Probably a sign of debility, but any one who has seen the typical tremor in sleeping sickness never forgets to look at the tongue in suspected cases.

(2) Enlarged Glands in the Neck. - Specially a chain

of small shotty glands following the posterior border of the sterno-mastoid muscle.

(3) Pain.—Nearly every case of incipient sleeping sickness is, to my belief, accompanied by pain, often of an indefinite character, most frequently in the head and chest.

(4) Itching.—Present in a certain number of cases, and in early stages before the characteristic roughness of skin and eruption of later stages makes its appearance. Not always present.

(5) Facial Aspect.—In early stages the onset of drowsiness is often suggested by a listless, heavy expression, easier detected than described, and most readily detected in people with whom one is familiar.

(6) Puffiness about the Eyes .- Not, of course, diagnostic of the condition. Often present in the latter part of the earlier stages, and, taken with the last sign, contributes to the general dull appearence of the sufferer.

(7, 8) Loss of Flesh and Strength. - Curiously enough, not always concomitant signs, as according to their own accounts at all events, some patients grow thinner without losing their wonted energy and strength and others grow weaker without getting thinner.

(9) Giddiness. — A very common complaint in incipient cases, and occurs often synchronously with

the pain in the head.

(10) Drowsiness.—By this is meant rather the mental lethargy of earlier stages than the profound somnolence of the established disease from which the name is derived.

These ten signs and symptoms were sought for, not that they are the only symptoms found in the early stages of the disease, still less that they are in any way diagnostic, but their presence, if marked, in cases that have the filariæ, is suggestive of the likelihood of filariasis running on to the established disease.

Without further prelimininary remarks we may proceed to an analysis of the statistics derived from

the four classes above mentioned.

Class A.—Peasant class, suffering from trival ailments, or in good health: 100 cases examined, fiftyfive male and forty-five females. Of the total number, fifty-five (55 per cent.) were found to contain the Filaria perstans. Of these twenty-seven were males and twenty-eight females. In other words, of the fifty-five males 49 per cent. were filariated, and of the forty-five females 62 per cent. were filariated. The incidence was therefore greater on the females, though very likely this may be corrected by a collation of larger numbers. Amongst the fifty-five who were filariated thirty-six (65 per cent.) had the tongue tremor, while only seventeen (38 per cent.) of the forty-five non-filariated showed this symptom. Amongst the filariated thirty-eight (69 per cent.) had glands in the neck, whilst among the non-filariated only twenty-five (55 per cent.). Among the filariated thirty-nine (71 per cent.) suffered from pain not attributable to other obvious causes, whilst the number of non-filariated with this symptom was twenty-six (58 per cent.). Itching was complained of by thirteen (24 per cent.) of the filariated, and by ten (22 per cent.) of the non-filariated.

A heavy appearance was noted in eighteen (33 per cent.) of the filariated, and in nine (20 per cent.) of the non-filariated. There was puffiness about the

upper part of the face in eight (15 per cent.) of the filariated, and in six (13 per cent.) of the non-filariated. There was loss of strength in twenty-two (40 per cent.) of the filariated, and in fourteen (31 per cent.) of the non-filariated. There was loss of flesh visible in twenty-four (44 per cent.) of the filariated, and in fourteen (31 per cent.) of the non-filariated. Giddiness was complained of in twenty of the filariated (37 per cent.), and in seventeen (38 per cent.) of the non-filariated. Drowsiness was present in eight (15 per cent.) of the filariated, and in five (11 per cent.) of the non-filariated. Now, bearing in mind the fact that after testing their bloods one can hardly over-estimate the number of filariated individuals in a given crowd, but that it is quite possible, and even likely, that an individual whose peripheral circulation is only slightly infected with filariæ may escape detection, especially where so few films are necessarily taken, we may interpret the above results as proving that filariated individuals, even when symptoms of drowsiness have not become a marked feature (15 per cent. as compared with 11 per cent.), yet show symptoms Nos. 1, 2, 3, 5, 8 to a more marked degree than non-filariated individuals; whilst the other symptoms alluded to were more evenly distributed between the two groups, and giddiness was actually more marked among the non-filariated. It must be remembered that these out-patients often complain of giddiness of gastric origin.

The number of filariæ found in a given specimen varied from one to as many as fifty. I have found no relation between the number of filarize in the peripheral blood and the severity of the somnolence; indeed, in many cases I have seen a disappearance of the worm from the peripheral blood shortly before the

onset of a fatal coma.

Turning next to the consideration of Class B, the in-patients of the hospital, we notice that out of fifty patients examined twenty-four were filariated—a proportion of 48 per cent. This is a somewhat lower rate than was found amongst the out-patient class, but only slightly so, inasmuch as both were drawn from people of the peasant class. Residence in hospital could not, of course, shield them from filaria infection, and many of them had only recently been admitted. But the interest of these figures lies rather in proving that the hospital is not a focus of infection, but that its inmates actually show a somewhat lower percentage of filariasis than out-patients do. Attention is drawn to this point, as before sleeping sickness was present in epidemic form the earlier cases were admitted as in-patients with a view to clinical observation and study. And occasionally, even with the greatest care, cases find their way in, in the earliest stages, suffering, it may be, also from some other intercurrent disease. Sleeping under the same roof with patients who have sleeping sickness is not unnaturally regarded as a strong predisposing cause of the disease, and, therefore, whatever theory one may have of the mode of transference of the infection, whether by blood-sucking insects or otherwise, yet the obvious precaution is to as far as possible segregate the sufferers and not let them come into contact or sleep under the same roof with the uninfected. In the Mengo Hospital, as above stated, sleeping sickness patients have in the earlier days of the disease, as found in Uganda, been admitted as in-patients until their death, and even now they occasionally, in the earlier stages, find their way, in, in spite of precautions to the contrary. it is with some relief that I found a lower infectionrate in our wards. Moreover, one patient whose hipjoint I had excised last year has been an in-patient for more than twelve months, and yet repeated examinations of his blood have shown no filaria, though the patient in the next bed to him had six in

one drop.

With regard to the comparison of the ten symptoms and signs detailed above as found among the filariated and non-filariated respectively in this class we note as follows: (1) Tongue tremor found in nineteen (79 per cent.) of the filariated, and in sixteen (61 per cent.) of the non-filariated twenty-six. (2) Glands in the neck were found in sixteen (67 per cent) of the filariated, and in nine (35 per cent.) of the nonfilariated. (3) Pain, not distinctly referable to such causes as caused patient to be admitted to hospital, viz., fever, surgical conditions, &c., was found in all of the filariated, a percentage of 45 per cent., and among the non-filariated six (23 per cent.). Itching was found in three (13 per cent.) of the filariated, and in three (11 per cent.) of the non-filariated. (5) A heavy appearance was noted in seven (29 per cent.) of the filariated, and in six (23 per cent.) of the non-filariated. (6) Puffiness about the face in three (13 per cent.) of the filariated, and in two (8 per cent.) of the non-filariated. (7) Loss of strength fell heavier on the non-filariated; thus, filariated six (25 per cent.), non-filariated nine (34 per cent.). (8) Loss of flesh: filariated six (25 per cent.), non-filariated ten (38 per cent.). (9) Giddiness affected two (8 per cent.) of the filariated and four (15 per cent.) of the non-filariated. Lastly, drowsiness was found in five (21 per cent.) of the filariated, but in only one (4 per cent.) of the non-filariated.

Thus we find a relatively higher proportion of the symptoms Nos. 1, 2, 3, 4, 5, 6, 10, whilst 7, 8, and 9, were more marked in the non-filariated. These symptoms, however, viz., loss of strength, loss of flesh, and giddiness are common enough amongst the

type of people found in hospital wards.

We next turn to Class C, the chiefs and natives living in the service of Europeans. Of this class seventy were examined and of that number twenty-five (36 per cent.) were filariated. This is a distinctly lower proportion than was found to obtain among the peasant

Tongue tremor was found in seventeen (68 per cent.) of the filariated, and in twenty (44 per cent.) of the nonfilariated. Glands in neck found in sixteen (64 per cent.) of the filariated, and in sixteen (35 per cent.) of the nonfilariated. Pain was found in nine (36 per cent.) of the filariated, and in fourteen (31 per cent.) of the nonfilariated. Itching was found in four (16 per cent.) of the filariated, and in five (11 per cent.) of the nonfilariated. A heavy appearance was noted about seven of the filariated (28 per cent.), and in thirteen (29 per cent.) of the non-filariated. Puffiness about the face was noted in two (8 per cent.) of the filariated, and not seen in the non-filariated. Loss of strength was found in three (12 per cent.) of the filariated, and not found in

the non-filariated. Loss of flesh was found in two (8 per cent.) of the filariated, and in three (6 per cent.) of the non-filariated. Giddiness was found in four (12 per cent.) of the filariated, and in three (6 per cent.) of the non-filariated. Lastly, drowsiness was found in one (4 per cent.) of the filariated, and not found in the non-filariated.

When we come to *Class D*, the Europeans in Mengo, we do not find the filariæ. Hence a comparison between the two classes is no longer possible.

The results of the preceding paragraphs may thus be summarised in tabular form :—

			Clas	Class A.		Class B.			Class C.		
			°/o in Fil.	% in Non-fi	n il.	°/o in Fil.	°/o ir Non-fi	il.	°/° in Fil.	% in Non-fil	
	Tongue Tremor		65 .	. 38		79 .	. 61		68	44	
	Glands in Neck		69 .	. 55		67 .	. 35		64		
	Pain			. 58		45 .	. 23		36	31	
	Itching										
	Heavy Appeara	nce	33 .	. 20		29 .	. 23		28	29	
	Puffy		15 .	. 13		13 .	. 8		8	. 0	
٠	Loss of Strengt	h	40 .	. 31		25 .	. 34		12	0	
	", ", Flesh		44 .	. 31		25 .	. 38		8	6	
	Giddy										
	Drowsy		15 .	. 11		21 .	. 4		4	0	
		-00 V				200				THE REAL	

These percentages are reckoned, of course, not with regard to the total number of patients examined, but separately in each group, relatively to the total number of filariated and non-filariated individuals of each class.

#### CONCLUSIONS.

(1) That a high proportion of the Baganda living in the immediate neighbourhood of the capital, Mengo, harbour the embryos of the parasite Filaria perstans in their blood.

(2) That different classes of natives show varying infection-rates; thus the peasant class were most affected (54 per cent.), then the sick in hospital (48 per cent.), and those who lived in the best hygienic surroundings fared best, chiefs and Europeans' servants (36 per cent.).

(3) Some cases of filariasis occur with absolutely no further symptoms of disease. Hence, in all probability they act as an immense source of danger to the uninfected population, and owing to the insidious onset of early symptoms, any attempt at segregation of filariated individuals must be attended with almost insuperable difficulties.

(4) That the majority of cases of filariasis are accompanied by some at least of the earlier symptoms of sleeping sickness, and hence a connection between the two conditions is highly probably. Especially if the converse be considered, viz., that a very high proportion of cases of sleeping sickness, if examined at the right stage, readily show the filaria in the peripheral blood stream—thirty-two cases out of thirty-four examined in the Mengo hospital.

(5) Although I have not found that the severity of somnolence depends on the number of Filaria perstans in the blood. I think that, as a rule, the number and severity of the earlier symptoms do vary with the number of the embryos in the blood.

(6) Some other factor, in addition to the presence of filarize in the blood, is required to aid the diffusion both of filariasis and of sleeping sickness, otherwise the hospital in which cases both of filariasis and occasionally sleeping sickness have been introduced ought

to act as a centre of infection, which it appears not to have done.

(7) Experiments ought to be carried out to determine what this factor is, e.g., testing the various blood-sucking insects on filariated individuals, to determine if they cause diffusion of filariasis, cf., Filaria nocturna and Culex; also, if possible, to determine how filariasis oversteps the boundary line that borders on the established disease of sleeping sickness.

Class A.—Patients Attending Out-Patients' Department Mengo Hospital, C.M.S.

#### One Hundred Patients.

Sex: M., 55; F., 45. Tongue, 53. Glands, 63. Pains in—chest, 20; head, 12; abdomen, 12; head and body, 4; head and chest, 7; body, 8; dyst., 1; chest and abdomen, 2. Itching, 23. Heavy appearance, 27. Puffy, 14. Loss of strength, 36. Loss of flesh, 38. Giddy, 37. Drowsy, 13. Filaria perstans, 55 per cent.; number of filariæ, 1—50. Slides used, 2 or 3. Address: Mengo, 58; Makerere, 6; Namirembi, 3; Mumgongo, 2; Rubaga, 2; Bira, 2; various other localties, 27.

Class B.—Patients Resident in C.M.S. Hospital, Namirembi.

#### Fifty Patients.

Sex: M., 31 (filariated, 14); F., 19 (filariated, 10). Tongue, 35. Glands, 25. Pains in—head, 7; chest, 3; body, 1; abdomen, 4; head and abdomen, 1; head and chest, 1. Itching, 6. Heavy appearance, 13. Puffy, 5. Loss of strength, 15. Loss of flesh, 16. Giddy, 6. Drowsy, 6. Filaria perstans, 48 per cent. Slides used, mostly 2.

## Class C.—Chiefs and Europeans' Servants.

#### Seventy Patients.

Sex: M., 67; F., 3. Tongue, 37. Glands, 32. Pains in-head, 5; chest, 7; chest and body, 1; abdomen, 7; chest and abdomen, 1; head and chest, 1; back, 1. Itching, 9. Heavy appearance, 20. Puffy, 2. Loss of strength, 3. Loss of flesh, 5. Giddy, 7. Drowsy, 1. Filaria perstans, 36 per cent. Slides used, mostly 2. Address: Namirembi, 36; Hospital boys, 10; Mengo, 10; Bulange, 12; Kampala, 1; Ndeje, 1.

#### Class D.—EUROPEANS.

#### Fifteen Persons Examined.

Sex: M., 9; F., 6. Tongue, 4. Glands, 1. Drowsy, 2. Slides, mostly 2 to 4. Address: Namirembe, 8; Ndeje, 5; Bulauge, 1; Ntebbe, 1.

#### BERI-BERI AT DIEGO GARCIA.

By Dr. J. Bolton.

Sanitary Warden.

(Published by the permission of the Colonial Office.)

Diego Garcia, the most southern island of the Chagos group, is situated 7°S. and 72°E. It is a narrow sand-bank, thirty miles long, shaped like a horseshoe; in breadth it varies from a few feet to two miles and more. The horseshoe encloses a magnificent bay, fifteen miles long and over five miles wide at certain parts.

There is no soil properly speaking at Diégo. The whole island is composed of a layer of sea sand of various thicknesses reposing upon a bed of madreporic formation. Here and there, where the brushwood is thick, a certain quantity of vegetable loam derived from decayed leaves is found mixed with the sand, to which it imparts a dark grey colouring. Vegetation is most luxuriant, and some forest trees attain large dimensions.

The whole island is reef-bound except at two or

three places in the bay.

It is almost entirely covered with cocoa-nut plantations of different ages. Here and there may be seen clumps of forest trees of great height and size. A belt of low trees grows all along the coast on both sides of the island.

There are two oil factories at Diégo; one at Pointe de l'Est, the most important, and the second at Pointe

Marianne.

The population of the island, composed of 466 souls, is divided between the two stations in the following proportion: 326 at the former and 140 at the latter.

#### AN OUTBREAK OF BERI-BERI.

The unusually high mortality observed this year is due to an epidemic of beri-beri, which began at Pointe de l'Est during the latter part of last and prevailed during the first half of this year.

The origin and progress of the epidemic were, as far as I could gather from the books of the estate and from information supplied me by Mr. de Caila, the Manager,

as follows :-

On July 27th, 1900, eight men and one woman, Mourima, Hosseinee, Vitah, Sambetti, Alfany, Moussa, Allee, Toolee, Sapikalee (w), landed at Diégo Garcia from Mauritius.

Although recruited in Mauritius, they had shortly before arrived from *Glorieuse*—they were natives of the *Comores* islands and of the East African coast.

When they landed at Diégo Garcia, Mr. de Caila was struck with their appearance. Seven had sore eyes, sore mouth and gums and swollen feet. Alfany suffered such severe pains in the legs that he could

hardly walk.

Three days after their arrival Hosseinee and Mourima applied for hospital treatment. The former had painful swollen legs, epigastric distension, sore gums. No fever. The swelling of the legs steadily progressed upwards as far as the knees. He kept going backwards and forwards to the hospital till January 14th, 1901, when he showed signs of cardiac distress, he breathed with difficulty, had palpitation, irregular pulse; he had also ædema over the sternum, and the pit of the stomach was very prominent. He died suddenly next day, January 15th, 1901.

In Mourima's case the symptoms were mild: pains in legs, ædema of ankles and calves. No cardiac distress. Recovered spontaneously at the end of a fortnight after having taken a couple of purgatives.

On August 6th, their friend, Vitah, was sent to hospital for swollen legs, pain in the calves and purulent (?) ophthalmia.

He refused to remain, but applied frequently as an

out-patient for treatment.

In the beginning of the month of January, 1901, he applied for admission as he felt worse. Mr. de Caila then noticed great swelling of the legs, which were also painful and tender, distension of the epigastrium, ædema over the sternum, great cardiac distress, with irregular weak pulse. No fever. He died suddenly the 12th of the same month.

The fourth case which came under observation was that of Sambetti, who showed the first symptoms in August last year, He used to attend the hospital

occasionally. The cedema of the legs gradually disappeared, and paralysis of the legs remained. On June 11th he was sent back to Mauritius, where he was admitted a patient of the Civil Hospital.

The next case among these Johannese was observed upon Alfany, who showed swollen and painful lower extremities; slight cardiac distress. He was sent back to Mauritius, and is reported to have got well on the voyage.

Allee, Moussa, Toolee, and the woman Sapikalee did not present any symptoms beyond stomatitis and

ophthalmia.

Up to now the disease had been limited to the Johanna gang. On March 27th, Louis Némorin Celestin, the hospital attendant, who, although he did not live anywhere near, or in the same camp as the Johannese labourers, had been, however, in constant attendance upon them, was found suffering from what he thought was colic. Mr. de Caila, however, at once notified that the abdomen and legs were swollen, and the latter tender on pressure. On April Sth, feeling, as he thought, better, he left the hospital against his master's advice. Next day he was brought back with violent pains over the heart, difficulty of breathing, præcordial ædema, and increased swelling of abdomen and legs.

He died suddenly at noon that day, although his condition in the morning did not indicate the possibility of such a sudden dissolution. A few minutes before death he had vomited some bloody liquid. He used to remain in the huts of the Johanna men several

hours at a time attending upon them.

On March 25th, Albert Sylvestre Gaïqui was admitted into hospital. For nearly one month previously he been complaining of numbness, tingling and pains in his hands, calves and feet. He gradually developed swelling of feet and legs, soon to be followed by sternal ædema and cardiac distress. Towards the end the face was slightly puffy.

The swelling got better under treatment (purgatives), but the cardiac distress persisted, and he died

suddenly on April 28th.

On March 15th Jean Baptiste Valentin sickened

with same symptoms and died on April 29th.

On May 9th a man named Joseph Wilson, a Malegasy, who, although he did not live near, nor in the same camp as the Johanna men, used to camp out with some of them (Alfany, Moussa, Allee and Sambetti) complained of nausea, palpitation, "pain in the heart." He had ædema over the sternum. No fever. He died suddenly next day. Five minutes before death he was walking in the ward.

The next person to be attacked was an Indian woman, named Edmée Verasamy. She had been confined on May 10th. A few days after, when in apparent health, she complained of pains in the legs. Mr. de Caila noticed the legs and the abdomen were swollen: cardiac distress was also observed. She gradually sank, evidently from heart failure, and died on May 22nd. She was conscious to the last minute.

On June 11th her husband, A. Verasamy, showed symptoms of Beri-beri, and died five days after. He was walking about in the ward, when he was seized with cardiac distress, and was dead in a few minutes.

Shortly before her death, Edmée had asked Mrs. de

Caila to adopt her baby. This she did and took it to her house on May 22nd. About the middle of June he showed symptoms of beri-beri and died on the 23rd of the same month.

Jules Imouche, who was the godfather of Armand Sylvestre Gaïqui, attended upon him during his illness and used to sit up all night with him. He developed symptoms of the disease shortly after his godson's death; his wife and son soon after him complained of similar phenomena. They all recovered. When I landed at Diégo I saw Jules Imouche. He had wellmarked atrophy, with slight paralysis of the right leg. The left felt heavy. Besides the above, the following had undoubted symptoms of the disease in a more or less mild form, viz.: Arthur Françis, Jean Michel, and Joseph Moolati. The first used to camp out with the same men as Wilson; the second nursed J. B. Valentin; the third had watched over the dead body of L. Némorin on April 11th. About ten days after he noticed his feet were swollen; he, however, continued to work till May 5th, when he remained one day in hospital. He was treated at home till the 13th, when he resumed work. He is perfectly well now, although he still complains of a certain heaviness in the legs.

Mrs. de Caila, who had been most untiring in her care of the sick, nearly fell a victim to the disease. She had undoubted sypmtoms of it. Œdema of lower extremities and over sternum; pain in legs. Cardiac distress, which at times was very severe; numbness in legs.

On July 1st *George*, the brother of Verasamy, applied for treatment. He presented symptoms of beri-beri. He recovered, and his was the last case observed.

The treatment adopted was purgatives, tonics, and good food. As the Johanna lot were all Mahommedans they were fed upon eggs, condensed milk, and fowls.

Besides the Johannese labourers, there were many others with them on board. Some were landed at Pointe Marianne, Point de l'Est, and others later on at the island of Peros Banhos. Not a single case of the disease was observed among them.

The Johanna gang was housed in a row of three huts of two rooms each, Nos. 1, 2, 3. The first two cases among them occurred in No. 1, the third and fourth in No. 3, and the fifth in No. 2.

Up to March 27th the disease seemed to have been confined to them. On this day, however, the hospital warder, L. Némorin, who did not live near them, but had been in constant attendance upon and nursing them, showed undoubted symptoms of the disease, and died a fortnight after. A. S. Gaïqui, who died on April 28th, lived in a hut opposite opposite Vitah's, but about 100 feet distant; J. B. Valentin's was behind Vitah's, and Joseph Wilson's was near Némorin's, but far from the others and to the windward.

Jules Imouche and family lived about fifty yards from Sambetti and Vitah's hut and to the windward.

The huts occupied by the Johanna gang had concrete floors in very good condition, except at No. 3, where it was broken up.

These huts have been burnt down.

On June 11th, the remaining Johannese were shipped back to Mauritius. On the 16th G. Verasamy sickened in a hut opposite Vitah's, in which Sambetti lived up to the day of his departure. This was the

last case, and the disease disappeared. No fresh case occurred on board during the passage back, which was a very rapid one  $(7\frac{1}{2} \text{ days})$ .

# DEATH-RATE AND INFECTIOUS NATURE OF THE DISEASE.

There can be very little doubt that the disease which prevailed at Diégo and killed nine persons out of twenty-one who were attacked was beri-beri of the mixed form, which is not attended with considerable anasarca.

The death-rate was nearly 43 per cent., and the attack-rate on total population of the infected camp was 11.5 per cent.

It is evident that it was imported into the island by the particular gang of labourers who had arrived from *Glorieuse* Island some time before they were shipped for Diégo.

The disease spread over a certain area of the camp

round the huts occupied by them.

The infectious nature of the disease was well established in the case of J. Wilson and the hospital attendant. Both these men did not live anywhere near the infected huts; the former, however, used to camp out with some of the sick men, and the latter, from the nature of his duties, was in constant attendance upon the sick, and therefore in contact with them.

The case of Jules Imouche and family is also very instructive. His godson, A. S. Gaïqui, being ill of disease, he brings him to his own house for treatment. He infects the whole family (three persons).

In the case of Mrs. de Caila, there can be no doubt that she caught the disease from the infant son of Edmée Verasamy. This baby had been removed to the main house after its mother's death; it was placed there under very much altered and improved conditions. It had a nice cot in a large, well-aired and lighted room, eight feet above the soil. It was nursed day and night by Mrs. de Caila, but it died, after having infected her. This baby had been removed from the infected area three weeks before it showed any symptoms of the disease, and died after an illness of eight days

There is ample evidence to show that the disease was conveyed to Diégo by a gang of labourers, and that it was afterwards carried more than five miles away by some of them to an outlying post, where Wilson was infected.

Dr. Manson is of opinion that the germ of the disease "resides in the soil, in the houses and surroundings of beri-beri spots."

The soil is the infected medium; the man residing on it is poisoned, not infected.

The manager's house at Diego is distant more than half a mile from the infected camp. It is constructed upon a stone foundation eight feet high. The main building itself is well constructed of teak timber.

The house is kept scrupulously clean and well aired. The baby who died in this house had been a resident there for three weeks before it fell ill, and while she was nursing it Mrs. de Caila began to notice the first symptoms of the disease upon herself; the baby had come to know her so well that it had to be kept in her lap to prevent it crying.

It is a significant fact that out of the seven persons sleeping in this house Mrs. de Caila should have been the only one attacked. She was in direct contact with the child. The dispenser did not live anywhere near the infected area.

#### THE FOOD SUPPLY

(deficient nitrogen theory) cannot in any way be

impugned.

The men of Diego have every chance of nourishing themselves well, and they take advantage of the

facilities offered them. It is true that the Johanna gang were Mahommedans, and as such did not eat pork, but they had every facility for obtaining fowls, eggs, sea-birds, and vegetables of all kinds, and limes are given to the men with a very free hand. On the other hand, the other inhabitants of the island who were attacked by the disease were young, strong, and well nourished, and the rice distributed to all the labourers, both of Pointe Marianne and Pointe de l'Est, had been in store before the arrival of the Johanna men, and was used before their arrival, during their stay, and after their departure without any untoward effect. I do not believe that dampness has anything to do with the production, maintenance or propagation of the disease. 1900 was an exceptionally dry year. When I arrived at Diégo I was told rain had not fallen for more than six months. The huts of the camp occupied by the majority of Beri-beri cases were dry, well ventilated and lighted, and possessed concrete floors. The manager's house is unusually dry and well ventilated.

#### THE HISTORY OF THE EPIDEMIC SEEMS TO TEACH:

That the germ of the disease, vegetable or animal, may remain latent in the human body for months, until local conditions favourable to its development obtain. It then proliferates and gives rise to the characteristic symptoms. I was told these Johanna men were loathsome in their habits; they were located together with a number of other passengers in the fore part of the "'tween deck," which is always ill ventilated, damp, stuffy and dark.

So that, coming from one of the Comores Islands with probably the germs of beri-beri latent in them, they found themselves on board under conditions favourable to the proliferation of the microbe, and landed at Diégo with the disease in a mild form.

Some time afterwards they communicated it to some of their nearest neighbours—to Wilson and to the

hospital attendant.

It would also appear as if the Johanna men were, so to speak, the culture media in which successive crops of germs were produced, and thus kept up the infection of the soil or air. The disease disappeared with the departure of these men. Again, although the huts occupied by Verasamy and others have since been reoccupied, no fresh case of the disease has appeared in them

There are some points of resemblance between the outbreak at Diégo and an epidemic of the disease which occurred in Fiji in 1894.

In that year 250 Japanese coolies were imported for a plantation at Laboosa in the month of April. Many of them had had the disease previous to their embarka-

tion. One month after their landing the first case was observed, that is, in May; from that time up to September only three cases had occurred. The disease then took up an epidemic form. By February, 1895, only 181 remained out of 250, and they were sent back to Japan. The disease disappeared then and has not apparently reappeared.

At Diégo some of the Johanna men were sick on landing in July. It was only in December, five months after, that the disease attacked other inhabitants of

the camp.

# CLIMATIC BUBOES IN KUSAIE, CAROLINE ISLANDS.

By The Rev. C. F. RIFE, M.D.

In a letter addressed to Dr. Manson, dated May

29th, 1902, Dr. Rife writes :-

"Having been for eight years a medical missionary on the island of Kusaie, on the most easterly island of the Carolines, I was much gratified last year to learn while in the United States on furlough, of your book on Tropical Medicine. I have been much interested in it since my return, as the books of a temperate climate are totally inadequate to a practice here. I have recently seen about thirty cases of climatic bubo, fifteen of which were under my immediate supervision, and as many more who were outside patients, and not seen by me more than once or twice. I have a training school for Marshall Islands natives, and have now twenty-one pupils, young men. About six months ago, four of them and myself made a tour of these islands on a small schooner that had just returned from Guam. One of the sailors had a long attack of climatic bubo, and one of my boys contracted it while we were on board ship. Since coming ashore. all but six of the number have had it. They are rather closely associated in sleeping and bathing. Two of the fifteen think that they had no previous wound for the infection to enter, but I have doubts about this. The others all had some abrasion of the skin to begin with. At about three to five days, apparently, from time of infection, the lower inguinal glands, usually but one, would become much enlarged (as you say, to about the size of a hen's egg), there would be a chill, headache, considerable pain in the back, and some fever. I always painted the surface over the gland with tinct, iodine, and sometimes made a second application. None of these cases suppurated, but I saw three outside cases which it was necessary to lance. The trouble at the seat of infection, however, was not so easily got rid of. There was much suppuration, and in two cases rather extensive The ulcers burrowing, which required the knife. which I had to deal with were not more than an inch in diameter, rather deep, with a punched-out margin, and much congested in the surrounding skin. After a period of suppuration of from one to four weeks, there would be a long and tedious recovery, with an ichorous discharge which lasted for weeks. There was much deep pain, and this seemed out of all proportion to the amount of ulceration. The pain was so severe that they could not stand for any length of time, and when at their worst it was almost impossible for them to walk. The cases which recovered quickest were well in four weeks, while some were twelve

weeks in recovering.

"All the cases in my school were below the knee, one boy also having two small ulcers on one hand. The Kusaians report the case of a woman who had a very large ulcer on the thigh. Of my boys, five had but one ulcer, while one had six. No one had enlarged glands except with the first infection. I found the treatment of the ulcers rather unsatisfactory. Nothing seemed able to abort them in their long I tried hot fomentations, plain and medicated, with no apparent success. After the period of suppuration was passed, the pain was much relieved by dusting the ulcers with calomel.

"Our climate is very moist. In 1899 I measured 256 inches of rainfall, and think I will have much more than that this year. Extremes of temperature are 75° and 90° F. Our island is high, about 26 miles in circumference, and has a resident population of 500, with about 120 natives of the Marshall and

Gilbert Islands, who are in training schools."

#### THE GAMBIA MEDICAL EXPEDITION.

THE eighth expedition of the Liverpool School of Tropical Medicine, under Dr. J. F. Dutton and Dr. J. L. Todd, will start for the Gambia and French Senegal on August 23rd. The French Government having been invited to attach a scientist to the expedition, M. Doumergue, the Minister of the Colonies, has written to say he would have been glad to accept the invitation, and to lend his support to an undertaking which is of the utmost importance to the future of colonisation, but that his department has itself just arranged to send to the French West African possessions special doctors for the purpose of studying the different tropical diseases there. He adds, however, that these doctors will be delighted, if occasion offers, to associate themselves with the Liverpool School of Tropical Medicine in its work.

#### DONATIONS TO THE LIVERPOOL SCHOOL OF TROPICAL MEDICINE.

AT the dinner to the members of the Tropical Diseases Section of the British Medical Association at Liverpool on August 1st, the Chairman, Sir Alfred Jones, K.C.M.G., announced that "a good friend of the School had given £25,000 to provide the necessary laboratories and other buildings, and he was proud to be able to announce that owing greatly to the energy and perseverance of Professor Boyce, £10,000 had been contributed for the endowment of a chair, the incumbent of which, he hoped, would never be less worthy than their present professor, Major Ross.' We congratulate the Liverpool School of Tropical Medicine on their good fortune.

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2.—All literary communications should be addressed to the

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3.-All business communications and payments should be sent to P. Falcke, Secretary to the JOURNAL OF TROPICAL MEDI-CINE. Cheques to be crossed London and South Western Bank, Great Portland Street Branch, London, W.

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# Journal of Tropical Medicine

AUGUST 15, 1902.

## British Medical Association.

SECTION OF TROPICAL DISEASES.

SECOND NOTICE.

#### DISCUSSION ON DYSENTERY.

The papers read will be printed in full in subsequent numbers of the Journal; an abstract of the papers is here appended.]

I.—Andrew Duncan, M.D., B.S.Lond., F.R.C.S., F.R.C.P., Lt.-Col. I.M.S. (retired).

UNDER the term dysentery more than one affection is included; the arguments for this conclusion are based on bacteriological investigations and the results of treatment.

#### Micro-Organisms.

Of the micro-organisms having a causative effect we have: (1) these of Ogata and Shiga (Japan); (2) Flexner's organism (Philippines); (3) the bacilli coli dysenteriæ (Celli and Fiocca); (4) pyogenic cocci; (5) bacillus pyolaxeus (U.S.A.); (6) paramecium coli in Cochin China (Treille); (7) ameba coli. The arguments advanced to prove that the amœba coli is the potent factor in causing dysentery and liver abscess has, as far as dysentery in India is concerned, not been proven. Hepatic abscess is rarely connected with dysentery in the West Indies, with the asylum

dysentery in England, and has scarcely been seen in the thousands of cases of dysentery which occurred during the South African war. The presence of the amæba in dysentery would appear to be a mere concomitant.

Treatment of Dysentery.

In acute cases in India there seems no sufficient reason to discard ipecacuanha properly administered. Cinnamon, when ipecacuanha cannot be tolerated, seems in drachm doses occasionally a useful substitute. Salines are commended in enthusiastic terms by many medical officers in India and elsewhere. Treatment by the Monsonia ovata is advocated by physicians in South Africa. Lavage of the intestine by boracic acid finds supporters, and so also the administration of sulphur and Dover's powder in certain conditions. In the treatment of chronic dysentery, bismuth in 20-grain doses with a minute dose of Dover's powder (gr. \frac{1}{4}) is at times attended by satisfactory results; and so also is the administration of eastor oil, 2 drachms every second night with a nightly suppository of 2\frac{1}{2} grains of liquid extract of opium.

II.—W. J. Buchanan, Major I.M.S. "The Prevention and Treatment of Dysentery in Institutions in the Tropics."

Based on an experience of 1,130 consecutive cases of dysentery, with only nine deaths, Major Buchanan states that amoebic dysentery is by no means so common as the bacillary form. Practically the common as the bacillary form. Practically the amœbic dysentery is only recognised by the occurrence of liver abscess, the finding of the amœba, or the absence of reaction with Shiga's bacillus. the 1,130 cases under consideration, not a single case of liver abscess in the living or dead was found. The dysentery of Indian prisons is probably almost entirely bacillary, and the applied tests have shown it to be due to Shiga's bacillus. Yet although the amœba and Shiga's bacillus are accepted as the causes of the varieties of dysentery, we are ignorant of the means whereby these organisms are carried into the human body.

Food and Drink as Causes of Dysentery.

Although water is admitted as the medium for the conveyance of typhoid, cholera and dysentery, few will admit that it is the only means of conveyance of these diseases. Specifically polluted water can certainly account for sudden widespread outbreaks of these diseases, but will it equally well account for the steady low persistence of cases after the defects in the water supply have been repaired? In other words, the water theory will explain epidemic prevalence, but it will not so easily explain endemic persistence. With regard to food as a cause of dysentery in institutions, although almost every article of diet has been condemned in turn, the real cause has not been arrived at. Certainly good cooking and good, well-cleaned (grain) warm food are efficient factors in checking dysenteric outbreaks.

Communicability of Dysentery.

So convincing are the proofs that dysentery can be communicated from the sick to the healthy, that it

seems imperative to (1) isolate patients suffering from dysentery; (2) disinfect all clothing &c., used by dysenteric patients; and (3) disinfect and incinerate dysenteric stools.

Treatment.

Curdled milk, boiled milk or rice-water, sago, arrowroot or such starchy substances, give the best results. Castor oil and laudanum to begin with is advisable; salines in acute cases answer well; ipecacuanha is worthy of respect; enemata may be useful; Izal is well-nigh useless; sulphur is not to be trusted.

III.—LEONARD ROGERS, Major I.M.S. "TROPICAL OR AMŒBIC ABSCESS OF THE LIVER AND ITS RELATIONSHIP TO AMŒBIC DYSENTERY."

The constancy of the amœba in tropical liver abscess is a striking fact in pathology. By tropical liver abscess is meant the large single or multiple abscess which is clinically recognisable as such during life, as opposed to multiple small pyæmic abscesses.

The amœba is seldom found in the liver pus which first issues on opening an abscess, but it is almost constantly found in scrapings of the liver abscess wall. On the other hand, amœba may be present and then disappear from the liver pus.

The Frequency of the Association of Dysentery with Liver Abscess.

Neither the clinical history alone, nor the post-mortem examination alone, afford correct information as to the frequency of this association, and it is only by examination of a series of cases, in which both clinical and post-mortem records are available, that the true proportion of cases in which dysentery is associated with liver abscess can be ascertained. The evidence collected strongly points to dysentery being an invariable accompaniment of the amœbic or tropical liver abscess.

The Value of Leucocytosis in the Diagnosis of Liver Abscess.

In Major Rogers' experience leucocytosis is most marked in comparatively small, deeply-seated abscesses of the liver, and less in those which are already beginning to come to the surface.

The Situation of the Liver Pus.

Major Rogers remarks that he has been frequently struck by the fact that even comparatively small amcebic abscesses are nearly always situated just under the surface of the diaphragm, between that organ and the liver, in the neighbourhood of the suspensory ligament.

Treatment.

Seeing that liver abscess is caused by the amceba dysenteriæ and that quinine in a solution of 1 in 5,000 will kill this organism, it seems rational to apply a solution of quinine to the abscess cavity, in the hope of checking the suppuration. This solution might be applied either by injection after merely aspirating, or as a lotion wherewith to wash out a freely-opened abscess.

DISCUSSION.

PATRICK MANSON, C.M.G., F.R.S., LL.D. (Physician Seamen's Hospital Society), remarked that

there were perhaps half a dozen diseases included under the term dysentery. He wished to convey a word of warning against relying too implicitly on agglutination tests as a scientific basis of differentiation of diseases. The term, amoebic dysentery, is no doubt a "catching" term, but it was just possible that it was not quite accurate. In certain types of dysentery recovery was the rule under any form of rational treatment, but in sloughing dysentery the opposite obtained. The potency of the bacillus of Shiga, and the influence of the amoeba in producing

dysentery, has still to be proved.

The cases of dysentery of tropical origin Dr. Manson met with in London were necessarily more or less of a chronic nature. In such cases he had found ipecacuanha a very efficient remedy. Given in large doses at first, and continued in lessening doses daily for a week or ten days, he had obtained excellent results with ipecacuanha. It was usual to administer this drug only in acute cases, but it was evident that if ipecacuanha is potent in destroying the specific agent of dysentery in the acute form of the disease, there was every reason to believe it would do so in the more chronic cases. Best in bed and the usual "soft" diet were essential principles to be followed in the treatment of the disease, and an occasional dose of castor oil. Salines were not without danger, at anyrate in chronic dysentery where ulcers obtained, and the treatment by salines had not proved efficacious in his practice.

The Hon. Dr. W. G. Rockwood (Ceylon) stated that he was of opinion that dysentery was to some extent a communicable disease, and that certain cases assumed a malignant character and proved fatal in three or four days, in spite of all known methods of treatment. He had employed the saline method of treatment with excellent results in the simpler forms of dysentery. He had seen liver abscesses in females, but he looked upon liver abscess in females as being

a very rare disease.

Dr. J. H. Musser (Philadelphia, U.S.A.) referred to the work of Flexner in connection with the bacillary form of dysentery due to the bacillus of Shiga. He upheld diagnosis by agglutination tests. Abscess of the liver is not a purely tropical disease, for Dr. Musser had seen isolated cases in persons who dwelt

in Philadelphia.

EDWARD HENDERSON, M.D.Edin. (late of Shanghai), observed that between the years 1868 and 1875 in Shanghai, dysentery was more severe than during any period of his subsequent practice in China. Dr. Henderson was accustomed to classify the cases he met with into catarrhal and diphtheritic; the former all recovered, the latter nearly all died. Ipecacuanha and other drugs, when administered in cases of dysentery that tend to get well of themselves, get the credit of curing without any justification whatever; ipecacuanha in diphtheritic cases did no good and in some cases seem to do positive harm.

James Cantlie, M.B., F.R.C.S. (Surgeon Seamen's Hospital, London), believed that in serious cases of dysentery the most effective plan of treatment would prove to be to perform a colotomy in the right lumbar region and wash out the large bowel by frequent douchings of warm boracic acid or sulphate of copper

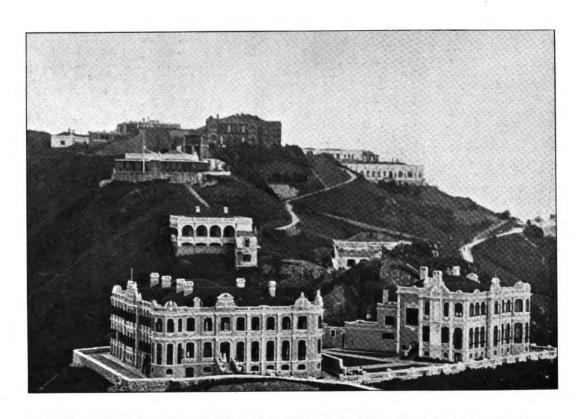
solutions. He agreed with Major Rogers that the most frequent site of abscesses, in which amoeba were found were in what Mr. Cantlie had termed the supra-hepatic abscesses, as distinct from the intrahepatic abscess. He had seen several cases of suprahepatic abscess occur in men who had only been in the tropics a few weeks and who had neither suffered from malaria nor from dysentery, or any intestinal flux that could be considered in any way dysenteric.

Inspector-General Turnbull, R.N. (retired), said he met with three varieties of dysentery in Hong Kong: (1) True sloughing dysentery; (2) an aphthous dysentery, commencing with aphthæ of the mouth and "going through the patient"; and (3) hypertrophy of the walls of the large bowel with erosion of the mucous membrane. He had treated three cases of liver abscess in Hong Kong by Manson's trocar and cannula. All the patients completely recovered and two of them remained in the tropics for many years afterwards without any recurrence of the disease.

F. M. SANDWITH, M.D. (Professor of Medicine, Medical School, Cairo), said the most important question to decide was, what dysentery really is, and how the poison enters the body. Asylum dysentery and ulcerative colitis existing in non-tropical countries are quite different to the typical dysentery of the tropics. The former disease, however, probably also occurs in "institutions" in the tropics and often yields readily to treatment. It is probable there are more forms of dysentery than the two we are accustomed to term the amœbic and the bacillary. He has believed for many years that dysentery is an infectious disease, and should be treated with the same precautions as Professor Sandwith ventured to draw a parallel between the possible production of dysentery by infected rice and the terminal dysentery met with in pellagra, a disease known to be caused by diseased Outside India ipecacuanha seemed useless, and he had long renounced the drug in his practice. If it is useful at all it is in chronic dysentery, when it should be given in small frequently repeated doses. Enemata he had long advocated, and he looked upon the practice of washing out the bowel by enemata of boracic acid solution, or of sulphate of copper, as not only the best method of treatment practically, but also as being the rational form of treatment to pursue.

# M. LOGAN TAYLOR, M.B., Ch.B. (Glasgow). Sanitary Work in West Africa.

After describing the state of Freetown and Cape Coast Castle as to their insanitary condition, Dr. Taylor stated that very careful drainage is necessary to get rid of anopheles larvæ, as the smallest collection of water left will harbour them. During the attempt to get rid of anopheles from Freetown, the smaller pools are merely swept out, but the larger pools are treated with some culicicide, either crude kerosine or crude creasote oil. By this means the larvæ are killed off when quite small. Formalin, corrosive sublimate, copper sulphate, carbolacene, &c., did not prove so efficient larvæ destroyers as kerosine or creasote oil. A little oil is simply poured in a pool and the water well stirred up, so that a film of oil spreads over the whole surface. Crude kerosine thus



THE PEAK HOSPITAL, HONG KONG, WITH DOCTOR'S RESIDENCE ADJACENT, RECENTLY BUILT.



applied will last a week, if no more rain comes. A half drachm of crude creasote oil, if added to a pint of water in which there are adult larvæ, and the water stirred up, the larvæ will die within five minutes. Pupæ are more resistant and will live for an hour or more, especially if they are on the point of hatching. Should, however, they succeed in hatching, the adult insects cannot fly away, for they are caught in the film on the surface the moment they are free.

# EDWARD HENDERSON, M.D.Edin., F.R.C.S.E. (late of Shanghai, China).

#### Heat Apoplexy.

Injurious effects from exposure to a high atmospheric temperature are divided into (a) those in which exhaustion with a normal or lowered temperature and little or no loss of consciousness prevails, and (b) those in which a high temperature and more or less complete loss of consciousness are the distinguishing features. The latter class is described under the names of thermic fever, siriasis, heat apoplexy, &c., and Dr. Henderson preferred to discuss it under the name of "heat apoplexy."

The cases seen by Dr. Henderson in Shanghai occurred amongst the foreign population, and chiefly among those visiting the port. Amongst the native Chinese heat apoplexy is a disease of comparatively rare occurrence, and he had never seen a case amongst

foreign women and children.

Heat apoplexy develops more frequently in the house than in the open, and it seems to develop, or at least reach its climax, during the night. Alcohol was a complication in the greater number of the cases of heat apoplexy. The mortality was considerably above the 50 per cent. spoken of in text-books. The patients were all adults; the temperature was 107° or over, and the greater number were alcoholic. Dr. Henderson advocated the early and efficient application of external cold, and he showed photographs of, and described exactly, a douching couch he had employed with great benefit. Heart failure is the common cause of death in heat apoplexy, and it is necessary to guard against reducing the body temperature below 102° or 103° whilst applying cold.

# Andrew Duncan, M.D., F.R.C.S., M.R.C.P. (Physician to the Seamen's Hospital Society, London).

#### The Prophylaxis of Sunstroke.

From personal experience of sunstroke in India, Dr. Duncan gave details of a plan of treatment which

answered admirably.

During several succeeding years he suffered from severe headaches, and during four hot seasons he had in addition intolerance of light and a tendency to unconsciousness. It was suggested to Dr. Duncan that the actinic rays of the sun and not the heat rays were the active agents in producing sunstroke, and that were the body enveloped as a photographer treats his plates, using always an orange-yellow wrapper, that the effect of the actinic rays on the body would be counteracted. Dr. Duncan, acting on this suggestion, wore an orange-yellow shirt, placed a similar coloured lining inside his service helmet and

inside the coat over the spine. After the use of this coloured material Dr. Duncan never again felt the influence of the sun to be overpowering.

(To be continued.)

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[The contents of this valuable annual we should wish to reprint in full. As, however, space is limited, we must content ourselves with placing before our readers in this issue a few extracts, and hope in subsequent issues to notice the remaining papers at some length.—Ed. J.T.M.]

OF THE BRITISH MEDICAL ASSOCIATION FOR 1901

#### FILARIAL LYMPHANGITIS.

By George C. Low, M.A., M.B., C.M.(Edin.). Cragg's Scholar, London School of Tropical Medicine.

#### CLINICAL FEATURES.

The onset of an attack of filarial lymphangitis may be provoked, especially in the old-standing cases of filarial diseases, by any trivial scratch or abrasion, getting wet or bathing in the sea, and is usually sudden. In some cases the individual may go to bed quite well at night, and suddenly wake up feeling chilly or even with a severe rigor upon him. Along with this sudden rise of temperature, which may reach 105° or 106° F., severe headache, sickness and vomiting, and often very marked delirium appears, the vomiting and general discomfort being more marked in the lymphangitis associated with filarial orchitis. If the case has never suffered from an attack before, and has no definite evidence of filarial disease, symptoms of pain localised in a limb, testicle or other part, or the formation of an abcess, at once puts one on one's guard, and leads one to make a careful local examination. The commonest feature complained of is pain in the glands of the part affected, and when the leg is this part, it is seen that the femoral group is tender, enlarged, and very painful on pressure. At the same time the limb is noticed to be swollen, generally only in the lower part, and a dusky redness is seen spreading upwards along the line of the lymphatics, these vessels feeling hard and cord-like to the touch.

After one or two days of high fever the temperature falls rapidly, and the patient is comparatively well; the delirium and headache have gone, the lymphangitis gradually becomes less, and the swelling and tension in the course of the next few days in many cases disappears completely, though in others a certain amount of thickening is left, which, when added to in subsequent attacks, eventually passes into the early stage of elephantiasis. When an abscess forms and complicates the case the temperature may not fall, or if it does, rises rapidly again and keeps high until the cavity is opened and drained; after this recovery quickly takes place.

#### DIAGNOSIS.

Practically speaking the only disease that can be mistaken for filarial lymphangitis in the tropics is malarial fever, but the local features of the former, apart from a blood examination, are so characteristic that mistakes should not arise. As there is no indigenous malaria in Barbados the diagnosis, as far as that island is concerned, becomes more simple still, and as the three cases were all natives who had never been out of the island, no possible doubt could arise as to the identity of the disease.

As will have been noticed already, the blood examination of such cases may give a negative result as regards filarial embryos, and that on several different occasions, but even without this help the local mani-

festations are quite sufficient.

In malarial cases the only point of resemblance is the rigor and sudden rise of temperature, but the examination of the blood on the admission of the case should show the plasmodium of that disease, and the temperature chart will be quite different in nature, having a daily rise for quotidian fevers and a rise on the third day in tertian fevers; further, there will be splenic tenderness, possibly enlargement, congestion of the liver, and an entire absence of lymphangitis and swelling of glands. It is possible that a filarial case might have malaria as well; but then the double set of symptoms would be present, the plasmodium would be found in the blood, and careful observations of the progress and the result of treatment would still further separate the two from each other.

#### PATHOLOGY.

The pathology of those attacks of lymphangitis is not yet thoroughly worked out, what part the adult the adult worms play in them being still uncertain. It is the exception to find embryos circulating in the blood, and that even in cases undergoing their first attack, such as occurred in several cases which I have examined. It may be that the death of the parent worms acts as the exciting cause for the attack, setting up some septic irritation which affects the lymphatics of the part, or at least if the adults have not died, the passage for the embryos into the blood must be completely shut off. Whether or not it then requires a fresh infection before another attack can take place can only be discovered by series of detailed post-mortem examinations of such cases, but as they never practically die from an attack of filarial lymphangitis it will be very difficult to determine this. In other cases embryos are sometimes found in the blood, but then those may be coming from adults lying in the lymphatics far removed from the seat affected.

Whatever the cause the lymphangitis would seem to arise first, either spreading downwards or in other cases upwards from the extremities, the fever, high temperature, and vomiting being results of this.

A certain class of cases in Barbados is known "as fever and ague" of the abdomen; those are rare and very fatal, but as far as I can ascertain no post-mortem examinations were made, and the conditions of the patients as to whether they were suffering from definite filarial diseases, such as orchitis, lymph scrotum, or varicose groin glands were not stated. It is conceivable they might have been caused by lymphangitis of the large vessels in the abdomen, complicated possibly by abscess formation; but until post-mortem examinations are made this is only theorising.

The lymphangitis tends to subside rapidly, even without any treatment, and, unless an abscess forms, quickly resolves and disappears, sometimes permanent

thickening being left and sometimes not.

#### TREATMENT.

This is simple. If the bowels are constipated they should be freely opened by some purgative. The patient must be kept in bed, put on milk diet, and the limb should be elevated slightly, and some antiseptic lotion such as 1 in 40 carbolic, or 1 in 2,000 mercuric chloride applied. In the orchitis cases the scrotum should be put in a suspensory bandage and also have an antiseptic dressing applied. If abscess appears it should be opened by the usual surgical methods at once, and completely drained. In the cases where the swelling tends to remain and become permanent, massage may be employed, and an elastic bandage used. Drugs are not of much use except to alleviate symptoms. Quinine and antipyretics have been tried; the former does not influence the fever, and the latter, though relieving the headache and discomfort, do not really benefit the condition. If the discomfort is extreme they should be given a trial, and if the pain is very severe, opium may be given.

EBBATUM.—In Dr. H. ZIEMANN'S article on Lomadera, in our issue for August 1, read Hæmoglobinuria for Hæmaturia.

#### FEVER CASES.

By C. P. Kennard, M.D.(Edin.), M.R.C.S.(Eng.).

Government Medical Officer.

As there is no doubt that many fever cases are not malarial, and in order to find out the fluctuations in the malarial cases during the thirteen months from August, 1900, to August, 1901, I examined all cases complaining of fever, or who had fever, admitted to Pln. Marionville Hospital, Wakenaam, by testing their blood, and taking their temperature charts and cases; these latter were used again for reference if they returned.

The forms of malarial parasites found, correspond to those described by Dr. Manson as benign quartan, benign tertian, and malignant tertian (æstivo-autumnal). I have not found what he describes as the

malignant unpigmented.

In some cases of fever I found, small actively moving bodies mostly in the shape of small rod- or pear-shape bodies, and frequently in couples in the red blood corpuscles; as these bodies never show pigment or would not stain by the ordinary malarial stains, and as quinine had not much action on the fever or bodies, I did not class these as malarial. I have, however, found these bodies in a few cases showing little or no fever, so I am doubtful at present if they may be pathological.

#### FEBRICULA.

Numerous cases of fever occur where there is some shivering, followed by hot fever lasting some hours, and maybe some sweating after this. The case is given a dose of mist. mag., and there is no recurrence. No malarial parasite being found, no quinine was given. These were classed as febricula; this class of fever corresponds to many cases seen in every district.

#### Low Fever.

Many cases of "low or inward fever" were tested both from the hospital and outside, and it is very exceptional to find the parasite in these cases; as most of us have had it at some time or other the symptoms of chill, headache, aching of the limbs, lassitude, with some feeling of heat, are well known. It may be from hot oppressive weather, often dyspepsia and torpid liver, often from worry, but it is very exceptional to be from malaria. There are numerous other causes for febricula, in fact anything that may be unusual; worms in children and adults, and dysmenorrhoea in women are frequent causes.

I am inclined to think there is more quartan fever about than is supposed; it is just the fever that a man may have a distinct attack, lie down till it is over, and then go about his business without feeling particularly bad. Quinine does not appear to have such a rapid action on this parasite as the pernicious form. The spleen was enlarged in eight of the cases; in none was there any pain or tenderness. In no case

was anæmia marked after it.

#### BENIGN TERTIAN FEVER.

There were 23 cases of benign tertian fever, four having recurrences, 8 men, 5 women, and 10 children. In these cases the fever is usually more pronounced than the benign quartan; it rarely keeps above the

normal continuously for more than two days; it usually shows a sharp rise and a fall to normal in a few hours, returning the next day or the day after; it is frequently irregular as to time and height of temperature, a regular every other day rise is unusual; sometimes very little rise is seen.

#### PERNICIOUS OR MALIGNANT MALARIAL FEVER.

There were 81 cases showing the form of parasite corresponding to that described by Dr. Manson as malignant tertian or æstivo-autumnal; 53 men, 16 women, 12 children: ten of these were recurrent cases, one four times, one three times, and the rest twice at not long intervals. The fever shown was very various; in a few there was very little fever, in others it was high and continuous for two to five days under treatment; some had a daily sharp rise with ague and sweating, others had an every other day similar rise; some had no ague, in others there was little sweating, and in two cases there was marked ague and sweating at the same moment with a high

temperature.

This fever undoubtedly causes more constitutional disturbance, and the patients are more "knocked over." afterwards, than in the benign forms. Some patients who had it mildly, however, appeared little affected; cases that had the benign form severely also had the pernicious form severely. Vomiting bile and "biliousness" was very common. Severe headache, which may not depend on the height of temperature, and pains in the limbs were present in nearly every case. Pain in the splenic region is rarely complained of and tenderness there rarer. Severity of the attack does not seem to depend on the abundance of the parasite seen in the blood, or the condition of the spleen, or whether previously anæmic, but more on the "biliousness" of the subject. An advanced case of phthisis had a rather sharp attack, and made a perfect recovery; a case of chronic Bright's disease was not specially affected by it: he was not given quinine; the albumen had diminished when he left hospital, and no crescents developed.

#### THE MOSQUITO AND MALARIA.

A LECTURE DELIVERED BEFORE HIS EXCELLENCY THE GOVERNOR, AND THE ROYAL AGRICULTURAL AND COMMERCIAL SOCIETY OF BRITISH GUIANA, FEBRUARY 13TH, 1902.

By A. T. OZZARD, M.R.C.S.(Eng.), L.S.A.

[We reprint the paragraph on the "Parasitology of Malaria" as a model for others to go by when explaining this intricate subject to laymen—a most important duty.—Ed. J.T.M.]

#### PARASITOLOGY OF MALARIA.

THE malarial parasite belongs to the large group "Protozoa." It possesses an extremely complicated and interesting life-history, the working out of which has perhaps stimulated more thought than that of any other pathogenic micro-organism.

It is parasitic in man and in a certain genus of mosquito (Anopheles); the former is its intermediate host and the latter its definitive host. In its human

host it undergoes various stages of development within the red corpuscle. Here during its stage of growth it is a tiny unicellular organism (1-8 micromillimetres diameter). Like other protozoa, it is made up of cell protoplasm, nucleus and nucleolus. It moves, it grows, it absorbs and assimilates food material, and it reproduces itself. Whilst within the red corpuscle the parasite exhibits amedoid movement, which enables it to change its shape and also its position in the red cell. The parasite assimilates the hæmoglobin of the red cell in which it is contained and elaborates from it characteristic melanin granules, the so-called malarial pigment.

The by far most interesting feature in the life-history of the malarial parasite is its method of reproduction. It possesses, like the coccididæ, and some other forms of animal life, two modes of reproduction, one endogenous and the other exogenous. The former is by sporeformation, and is an asexual process. process can be carried on and obtain maturity in man without the intervention of the mosquito. The latter is a sexual process which can only be completed by passage through a certain genus of mosquito. asexual cycle was first carefully described by Golgi, and has been termed the Cycle of Golgi. The sexual cycle is due in the main to the brilliant researches of Major Ronald Ross, late of the Indian Medical Service, and has been called the Cycle of Ross.

The necessity for the Cycle of Ross for the perpetuation of the parasite is evident, because in the absence of an intermediary carrier, such as the mosquito, the malarial parasite would be unable to pass from man to man, and on the death of its human host would die also.

The diagram illustrates in a schematic way the phases of development of the endogenous and exogenous life cycles of the malaria parasite respectively.

If the blood of a patient be examined during an attack of malarial fever, say, of the benign tertian type, and if this examination be made shortly after a rigor, a certain number of the red corpuscles will be found to contain tiny amœboid bodies. They are pale and indistinct. They are constantly changing shape, protruding and retracting pseudopodia. At this early stage of development there will be no pigment granules present. If the blood of the patient be examined again after an interval of twelve hours the parasites will be found to have increased considerably in size and to occupy now about one-quarter of the red corpuscle. They are still actively amœboid. A few granules of pigment will now be observed in the protoplasm of the parasite. If the blood examination be repeated after a second interval of twelve hours the parasites will be seen to have increased still further in size and to contain more pigment. Amæboid movement will now be becoming less active. If these blood examinations be continued at serial intervals a gradual increase in the size of the parasite can be traced, until a short time before the next rigor they come to occupy nearly the whole of the red corpuscle. At this stage the pigment will be scattered throughout the protoplasm of the parasite, and it will be abundant and coarse in grain owing to the agglomeration of separate granules. If an examination of the blood be made at the outset of rigor, the parasites will be found to be at the sporulating stage showing the so-called rosette bodies. The shape, size, number, and arrangement of these spores vary with the species of the parasite. In the benign tertian infection, of which we are now speaking, the sporulating body is made up of 15 to 23, in the quartan 6 to 14, and the malignant 5 to 12 spores. The final stage, which is best observed in quartan infections, is the rupture of the red cell and the diffusion of the spores in the plasma. The corpuscular débris and pigment granules are rapidly taken up by phagocytes, whilst the free spores rapidly gain entrance to fresh red corpuscles and become the new generation of young endocorpuscular parasites. The young intracorpuscular bodies are termed amabula, the rosette bodies sporocytes.

In addition to the bodies just described there will be found in the blood in the case of the benign fevers large pigmented spheres, and in the case of the malignant fevers the well-known crescent bodies. These represent the form of the parasite which require to enter the stomach of the mosquito (Anopheles) in order to attain

full development.

In the case of the benign fevers the spheres make their appearance in the peripheral circulation within one or two days from the onset of fever, usually during the apyretical period. The crescent bodies, however, do not as a rule appear in the blood until about one week from the onset of the fever, sometimes later than

If the blood of a patient, known to contain crescents, be watched, these bodies will be observed to become gradually kidney-shaped and oval, and then spherical, A certain number of these newly-formed spheres will be seen to become agitated, and the pigment they contain will become extremely active and dancing. Suddenly one or more flagella are shot out. These filaments possess a rapid vibratory and lashing movement, and at first, on account of their great activity, they can be seen with difficulty. Gradually movement becomes less active. The flagella will then be seen to be about four or five times the length of the diameter of the red corpuscles, colourless, free from pigment, and bulbous or beaded in some point, or throughout their continuity. A certain number of spheres, however, will remain quiescent and will be observed not to flagellate. These latter are the females (macrogametocytes-vessels containing big wives), the former the males (microgametocytes-vessels containing little husbands). The difference in the sex of the crescents can be readily distinguished by a certain method of staining the blood. According to Ray Lankester, the flagella must be regarded as homologues of the spermatazoons of higher animals. The next stage, the flagella break away and approach the non-flagellating spheres, which at one point have developed a small At this point a flagellum enters, having previously become rigid and motionless. entry a certain amount of disturbance takes place in the sphere. It soon, however, becomes quiescent and then elongates, the pigment becoming gathered at the posterior or thicker extremity of the now fertilised cell. It now assumes the shape of a spear head and becomes actively motile, moving freely in all directions (travelling vermicule). It is believed that it is this body that pierces the stomach of the mosquito and develops into a zygote (zuywtos-yoked or wedded).

The next stage can be readily observed in the case of human malaria. If a number of Anopheles be made to bite an individual whose blood contains crescent bodies, and if these mosquitos be killed at intervals and examined, the following changes may be seen: If one be killed a few minutes after feeding, the blood contained in its middle intestine will be found to contain flagellating and non-flagellating spheres; if a mosquito be killed on the second day after haustellation and the wall of its middle intestine examined pigmented spheres (zygotes), about 7 or 8 micromillimetres in diameter, will be seen lying in and disassociating the muscular fibres; if infected mosquitoes be examined on subsequent and successive days further changes in the development of the parasite can be traced out. The pigmented spheres increase rapidly in size and become surrounded by a capsule. They will be seen to contain smaller spheres (zygotomeres) which apparently divide and sub-divide, and each of which contains chromatin matter which also divides and sub-divides. Eventually bud-like processes develop on the surface of these little spheres giving them a hedge-hog appearance; usually 10 or 12 such spheres (blastophores-germ-carrier) are formed. These bud-like processes gradually become elongated and sickle-shaped. They finally fill the cell completely, the remains of the secondary spheres disappearing. As these large spheres mature they protrude through the outer surface of the wall of the middle intestine as warty processes, and in heavy infection they are present in large numbers. (Their size varies from 40 to 60 micromillemetres). Eventually they rupture on their outer surface, and the sickle-shaped bodies (sporozoites) they contain become free and are carried in the body fluid of the mosquito to its salivary glands, where they appear to be filtered out by the middle. lobes of the glands. It is these bodies which are the actual source of infection to man, and they have been traced as far as the end of the proboscis of the mosquito.

The mosquito cycle occupies a time varying between six and sixteen days or even longer, depending on temperature and possibly on other factors.

## DESCRIPTION OF A FEMALE PARENTAL FORM OF THE FILARIA DEMARQUAYI.

By A. T. OZZARD, M.R.C.S.(Eng.), L.S.A.

THE following description unfortunately fails to definitely settle certain important points, owing to the faulty condition of the specimen when received. It was found impossible to sufficiently clarify and stain it so as to bring out certain important characteristics, notably of the tail-end.

A female parental form of F. Demarquayi was sometime back sent to me by Dr. Otho Galgey, of St. Lucia. The specimen was a dead dried one on a glass slide, and not in spirit. I endeavoured to clarify it by means of absolute alcohol and oil of cloves; but not so successfully as could have been wished. It was then stained with logwood.

The specimen is a complete one, and measures, in its dried condition, about  $2\frac{1}{2}$  inches. At its broadest point it measures about  $\frac{1}{100}$  inch.

The head and tail-ends are deeply stained, interfering somewhat with a detailed examination.

The head is rounded, and an indication of a minute mouth can be made out with a high power. No differentiation of alimentary canal into cosophagus and intestine can be made out. To all appearance the head is similar to that of the female parental form of Filaria perstans, as described by Dr. Daniels in the British Medical Journal of April 16th, 1898.

At a distance of about  $\frac{1}{40}$  inch from the head, the specimen is unfortunately broken; it is possible that at this point the vagina opens externally, as at no other part can any indication of the termination of the vagina or ovarian tubules be made out.

An alimentary canal is clearly seen running the whole length of the specimen, and to all appearances this canal terminates at the extreme tip of the tail, instead of in a papilla, such as is the case in the parental forms of F. nocturna, F. perstans, and the so-called F. Ozzardi. It is true that at a distance of about  $\frac{1}{100}$  inch from the tip of the tail there is a slight divergence in the outline of the animal; but under high powers even, no appearance of the intestine terminating there is suggested, nor does it appear to be anything more than a slight irregularity in outline.

The absence of an anal papilla, therefore, is in marked contrast to what obtains in the parental forms of F. nocturna, F. perstans, and the so-called F. Ozzardi.

The tail is sharply curved for the last  $\frac{1}{100}$  inch or more, similar to the curves of the tails of the parental forms of other filariæ.

The tip of the tail appeared to be made up of four papillary processes (two seeming to overlap the other two) instead of two processes, as described by Dr. Daniels in the female parental form of F. perstans, or the bulbous termination of the female parental form of F. Ozzardi.

As in other parental forms, there are two ovarian tubes containing ova and embryos in various stages of development. The embryos are so coiled up and crowded together that it is almost impossible to say whether their tails are sharp or blunt; but as Dr. Galgey ascertained that the host during life-time contained numerous F. Demarquayi and no blunt-tailed embryos, it is not of much importance.

The breadth of the ova varied from  $\frac{1}{3000}$  to  $\frac{1}{1200}$  inch. The breadth of the ova of F. Bancrotti as given by Lewis, varies from  $\frac{1}{1300}$  to  $\frac{1}{130}$  inch. In other words, the ova of the parental form of F. Demarquayi are about equal in breadth to that of the embryo F. nocturna itself. So that it is easily understood that diseases such as elephantiasis do not occur in those the hosts of F. Demarquayi or the other minute filariæ, such as F. perstans; whereas they may do so in those the hosts of F. nocturna, in consequence of the greater breadth of the ova of the latter.

It is unfortunate that the tail-end of this specimen could not be clearly defined. Dr. Daniels in a private letter to me, states that in a similar specimen (female parental form of F. Demarquayi) examined by him, the tail ended in two rounded knobs, quite different to what obtains in the parental forms of F. Ozzardi.

It is of the utmost importance, therefore, that clear descriptions should be given of the parental forms (male and female) of both F. Demarquayi and the so-called F. Ozzardi.

Dr. Low, of the London School of Tropical Medicine, during his recent visit to the West Indies, established the fact that the embryo forms of F. Demarquayi and F. Ozzardi are absolutely indentical; a point about which there was previously considerable doubt.

The fact that the embryos are similar in size and appearance, however, is not sufficient to establish their identity as a species. For as in the case of F. nocturna and F. diurna, although the embryos are absolutely indentical in appearance, owing to their difference in periodicity they are classed as two distinct species. If, therefore, it can be established that the parental forms of F. Demarquayi and F. Ozzardi present certain different well-marked characteristics, or, on the other hand, are absolutely similar in all respects, their identity or otherwise will at once be settled.

It is worth noting that the distribution of F. Demarquayi and F. Ozzardi is entirely different. Whereas in British Guiana the latter embryo is only found at distances up the big rivers and not along the coast-line, in St. Lucia and St. Vincent there is no such characteristic distribution of the F. Demarquayi.

## Current Literature.

#### PLAGUE.

#### PREVALENCE OF THE DISEASE.

India.—During the weeks ending July 12th and 19th, the deaths from plague in India numbered 1,158 and 1,100 respectively. In the Punjab the number of deaths from plague had during these weeks fallen below 100. In the Bombay Residency there is evidence of a recrudescence of the disease.

EGYPT.—During the weeks ending July 27th and August 3rd, the fresh cases of plague in Egypt numbered 10 and 5, and the deaths from the disease 5 and 2 respectively. In Alexandria most of the cases of plague occurred, but from Toukh, and Damanhour, cases are also reported.

CAPE OF GOOD HOPE.—During the weeks ending July 12th and 19th, the number of fresh cases of plague in Port Elizabeth numbered 3 and 0, and the deaths from the disease 2 and 1 respectively.

Hong Kong.—During the weeks ending July 26th, August 2nd and 9th, the fresh cases of plague numbered 33, 31 and 14, and the deaths from the disease 29, 34 and 13 respectively.

MAURITIUS.—During the weeks ending July 31st and August 9th, the fresh cases of plague numbered 6 and 2, and the deaths from the disease 5 and 1 respectively.

#### EXCHANGES.

Annali di Medicina Navale. Archiv für Schiffs u. Tropen Hygiene. Archives de Medicine Navale.

Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie.

Australasian Medical Gazette. Boletin de Medicina Naval.

Boston Medical and Surgical Journal.

Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology. British Medical Journal. Brooklyn Medical Journal. Caducée. Climate. Clinical Journal. Clinical Review. Giornale Medico del R. Esercito. Hong Kong Telegraph. Il Policlinico. Indian Engineering.
Indian Medical Gazette. Indian Medical Record. Janus. Journal of Balneology and Climatology. Journal of Laryngology and Otology. Journal of the American Medical Association. La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal Medical Brief. Medical Missionary Journal. Medical Record. Medical Review. Merck's Archives. New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyclinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo. Sei-i-Kwai Medical Journal. The Hospital. The Northumberland and Durham Medical Journal. Treatment.

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1.—Manuscripts sent in cannot be returned.
2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.
4.—Authors desiring reprints of their communications to the Journal of Tropical Medicine should communicate with the Editors.

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

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In order to meet the constant enquiry for addresses of respectable firms catering for the various requirements so difficult to obtain abroad, we give a list of names and addresses which we trust will be found useful to our numerous correspondents and subscribers.

### Original Communications.

SOME CLINICAL NOTES ON A EUROPEAN PATIENT IN WHOSE BLOOD A TRYPAN-OSOMA WAS OBSERVED.

By R. M. FORDE, L.R.C.S., &c. Colonial Surgeon, Gambia, W. Africa.

H. K., aged 42, European, Master of Government steamer, River Gambia, West Africa. Six years in the service of the Gambia Colony.

Previous health in West Africa: With the exception of one or two ordinary attacks of mild remittent fever he always enjoyed good health on the Coast up to the onset of the present illness, and was what I should describe as a man of robust constitution, living

a most regular and steady life.

Mr. K. reported himself sick on May 10th, 1901, stating that he was feeling feverish and out of sorts for some days past. I admitted him into the Colonial Hospital, Bathurst, when I found him suffering from what I at first took to be an ordinary attack of malarial fever and put him on small doses of quinine accordingly. After a few days' treatment I noticed very little change in the course of the temperature, and took some slides of blood for microscopical examination, in which I found no malarial parasites, but found in nearly every specimen, and on frequent subsequent examinations, small worm-like, extremely active bodies, which I prematurely pronounced a species of filaria; this conclusion, however, became doubtful after repeated observations of the parasite, and at the same time I could not resist associating the peculiar course of the illness, its symptoms and resistance to treatment, to the presence of these worms, whatever they might be. At the end of three weeks the patient was invalided to Europe, and I strongly advised him to present himself for treatment at the Liverpool School of Tropical Medicine (his home being in Liverpool) and to write and let me know when he had done so, but unfortunately I never heard any more about him until his return from sick leave in December. In the meantime, Dr. J. Everett Dutton, from the Liverpool School of Tropical Medicine, arrived at Bathurst, and having told him about the case and what I had seen, he examined the patient's blood on the first opportunity and discovered the same parasite I had found some months previously, which he at once recognised as a species of Trypanosoma.

Symptoms.—As seen by the accompanying charts the temperature is not that of malarial fever, it is irregularly intermittent with, as noted by Dr. Dutton, two or three days of normal, or subnormal, periods, it was not affected in any way by drugs, large doses of quinine and the usual antipyretics having only a

temporary, if any, effect on its course.

The skin was as a rule dry, with later, irregular patches of a congested or cyanosed character appearing on different parts of the body, the colour slowly returning after pressure. An edematous condition made its appearance early, most marked on the face below the eyes, producing a characteristic fulness in that region, which varied in degree from a scarcely noticeable swelling to well-marked puffiness; this condition was also noticed in the lower part of both legs and around the ankles, but only in a slight degree.

The respirations were always above the normal rate, ranging from 20 to 30 per minute, periodical accelerations recurring quite independently of any rise of temperature, and whilst the patient was quietly lying

in bed.

The pulse was also accelerated, ranging from 70 to 120; there seemed to be no relation between the rate and the temperature, sometimes it was highest when the latter was subnormal, at others a maximum temperature was accompanied by a minimum pulse. The beat was always strong and regular. I could detect nothing abnormal in the position of the heart, but the sounds had a peculiar muffled character.

The urine was passed in fair quantity and was

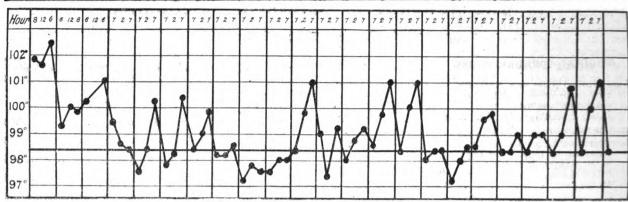


CHART I .- SHOWING IRREGULAR INTERMISSIONS.

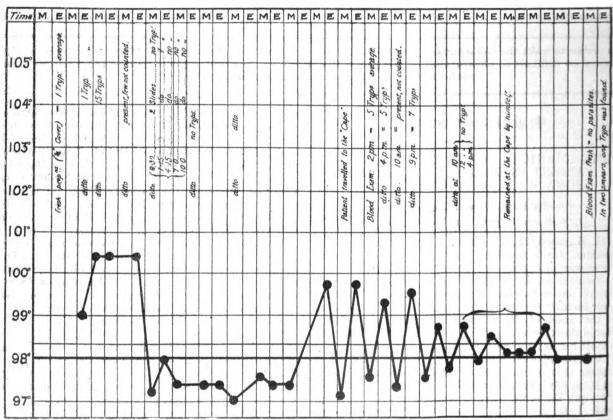


CHART II .- TEMPERATURE MODIFIED BY DRUGS, TRAVELLING, &c.

always free from albumen; its appearance and general characters were normal, but later high coloured.

The bowels were fairly regular, an occasional aperient being administered.

The appetite was bad all the time, and though a fair amount of liquid nourishment was taken daily the patient gradually lost weight and colour, and became very emaciated.

The liver and spleen were practically normal in size and position, there was no tenderness and nothing of an unusual character was detected during the three weeks' stay in hospital. Since that time both have become enlarged.

For some months, January to April, 1901, previous to reporting himself to me, the patient had an exceptionally hard time in connection with military operations in the Gambia, which entailed his being on duty night and day, and he thought he was simply run down from overwork and want of proper rest. As the greater part of this period was passed in creeks surrounded by extensive swamps, in which are to be found large numbers of mangrove flies, mosquitoes and other diptera (including, according to Dr. Dutton, a small species of tsetse fly), and neither mosquito nets nor other means of protection from the bites of these insects being in use on the steamer, it is most probable that infection took place at this time.

Seeing that the patient made no improvement, and that he was steadily losing ground, I invalided him to England, hoping the change of air and sea voyage

would have a beneficial effect; he returned, however, looking no better, having been taken ill on the outward voyage with what was said to be an attack of pneumonia. After two or three weeks he felt sufficiently strong to return to duty. All this time the irregular temperature and the other symptoms, with a feeling of weakness in the lower extremities, persisted, but to a lesser degree.

Treatment.—The only drug that produced any good result was arsenic (Fowler's solution) in graduated doses, there was a general marked improvement under its influence, but all the symptoms returned after it was discontinued for some time. Rest and light nutritious diet were the chief means of sustaining the

patient's strength.

Remarks.—The chief characteristics of this case were as follows: (1) The irregular intermittent temperature; (2) the edematous condition of the face and lower extremities; (3) the rapid and variable pulse and respiration, unaccompanied by any evident cause; (4) loss of weight with marked debility, wasting and lassitude; (5) the persistence of these symptoms and their resistance to treatment.

I have lately noticed similar symptoms in natives, but have not succeeded in finding the parasite referred to in this case in the few cases examined; Dr. Dutton has, however, found the worm in the blood of a native child three years old, but who showed no symptoms

of disease.

#### THE PARASITE.

The accompanying photograph, kindly sent to me by Dr. Dutton, shows the appearance and position of the parasite in a stained preparation, and he informs me that it presents all the characteristics of the genus Trypanosoma, and morphologically is very nearly related to T. brucei.

# SOME POINTS IN CONNECTION WITH THE OPERATION FOR THE EXTRACTION OF CATARACT IN INDIA.

From an Experience of over 2,000 Cases.

By Capt. R. H. Elliot, M.B., B.S.Lond, F.R.C.S.Eng., &c.,
I.M.S., Madras.

#### PRELIMINARY CONSIDERATIONS.

In selecting cases for cataract extraction one cannot afford to neglect the condition of the conjunctiva. Even the slight forms of conjunctival congestion so commonly met with in Indian practice require "watching"; if there is any morbid secretion on the lids in the early morning, preliminary treatment is necessary. Silver nitrate is most generally useful, but there are not a few cases which, while intolerant of stronger remedies, will quickly yield to mild lotions such as lotio acidi borici.

In a series of 500 cases, in which I was inclined to think lightly of slight departures from the normal in the state of the conjunctiva, thirteen out of 261 of such cases, or 4.98 per cent., showed septic infection with suppuration, against six out of the remaining 239, or 2.51 per cent. In a succeeding series of 250 cases, conjunctival complications figured at 172, in 100 of which treatment lasting from three to thirtyone days was given before operation; in two of these,

or in 2 per cent. of those submitted to preliminary treatment, suppuration manifested itself. In the remaining 150 there were three suppurative cases, or again 2 per cent. It would thus appear that attention to the conjunctiva had eliminated the extra risks consequent on an unhealthy state of the membrane.

It is seldom necessary to interfere with a pterygium, provided that the conjunctiva is otherwise healthy, and that one can avoid cutting the growth during one's section. I find that out of seventy-six cases of pterygium occurring in 827 cataract extractions, five gave trouble; in only one of these was convalescence seriously delayed; in this case the conjunctiva had required treatment beforehand, and was exposed to the strain of prolonged bandaging, owing to the patient bursting his section by rubbing the eye. In all five of the cases good vision was obtained, as also in the remainder of the seventy-six. In two instances the pterygia were transplanted some time before extraction. One is very loth to operate for cataract in cases of recent corneal mischief, even though the eye appears quite quiet again; a long interval should be allowed to elapse first. A dexterous operator will be able to so place his incision as to obtain an iridectomy in any required position, and will thus be able to deal with a central opacity and with the cataract at one sitting. It is very inadvisable for anyone to attempt this who has not absolute confidence in his powers; he will be better advised if he does an iridectomy in the most suitable direction as a preliminary operation, and deals with the cataract a month later.

Posterior synechia is always a serious complication of cataract. I find that I met with it nine times in my last 827 cases. In seven cases excellent results were obtained, although in one about one-sixth of the vitreous was lost during vectis delivery of the lens. In one case of complete posterior synechia, vision was raised from mere perception of light and darkness to ability to detect hand-movements at 3 metres. In one case vision was lost due to iritis. The loss of one eye in nine is justified by the results of the other eight. Only one case of anterior synechia appears among the same 827, though there was some iritis

after extraction; the result was satisfactory.

In 2,000 cases I cannot remember any case in which mischief in the lachrymal passages has prejudiced the result of an operation for cataract; in the last 827 cases the complication occurred four times; in these, as in my previous cases, the duct was well dilated, and the parts brought into a healthy condition beforehand.

In suitable cases I would not hesitate to excise the sac as a preliminary measure, as is the custom of several of the leading continental surgeons I have met.

Considerable variation is met with in the tension of eyes requiring cataract extraction. In 827 cases ninety-nine showed an increase, and sixteen a diminution in tension; under this head are now being considered only cases which in other respects appeared suitable for operation, markedly pathological conditions are excluded.

The percentages of success work out at 89.9 in the eyes with raised tension and 81.25 in those with lowered tension, against 93.34 per cent. on the total

of 827.

It is no uncommon thing in India to meet with partially dislocated cataracts which, in almost every case, are the fruits of the Mahomedan Coucher's work. If otherwise the case is favourable one should extract the lens. In the last five years I have operated on nine such cases, and with most encouraging results. It is well for the operator to remember that if the attempt is a failure he will almost certainly be credited with the whole responsibility. In such cases the principal danger is from loss of vitreous, the lens should be delivered in its capsule; this can usually be easily affected by manipulation after iridectomy, but should difficulty be encountered bold vectis delivery is indicated.

Not all cases of *irido-donesis* are due to dislocation; a certain percentage are met with in old shrunken lenses, and are presumably to be attributed to overstretching and relaxation of the zonule of Zinn; the treatment is as for partial dislocation. Of eight such cases, of which I have notes, seven recovered good vision

There is a class of cases in which the *iris does not react freely to mydriatics*, sometimes dilating very slowly and partially, at other times dilating irregularly, and yet no evidence of iritis or of synechiæ exists; seven such cases, of which I have notes, made uninterrupted recoveries. It would be most inadvisable to attempt in these the simple operation.

Some years ago I freely tried the method of "preliminary iridectomy" as a separate operation, combined in many cases with massage to hasten maturation, but have ceased to employ these manœuvres, as while dissatisfied as to their utility, I found them not free from objections. At the main operation one not infrequently finds that small posterior synechiæ, the result of the previous iridectomy, complicate delivery; then, again, there is the inconvenience to the patient, and the danger withal, of two operations instead of one. A distinguished Indian operator (now retired) used to make a downward and inward iridectomy in slow developing immature cataracts. I have seen old patients of his, who, thanks to this treatment, enjoyed many years of useful vision; but the coloboma in this position is a distinct disadvantage after extraction, and I consider the method vastly inferior to that of MacKeown, of Belfast, of which after trying it in a large number of cases, I can speak in the highest terms.

Diabetes and albuminuria have been urged by some as a bar to operation. I have operated with success in both of these conditions, and provided the general health of the patient is good, I do not consider either of them as forbidding extraction. The same may be said of old age. My oldest patient in the 2,000 cases was said to be about 90; she looked like a shrivelled old monkey, but she was full of vitality and made an excellent recovery, using her restored sight for the first time to steal a neighbour's necklace the night after operation. An active European lady of over 80 did equally well, and insisted on leaving the private hospital she was in to return home a fortnight after operation.

On the other hand, any conditions which depress the general health indicate a postponement of the operation till the patient is in better condition. This is well illustrated by a recent case in which the patient, a weakly man, was doing well on the tenth day, and appeared to be out of danger, when a sudden violent attack of diarrhea came on and the cornea suppurated before the patient's death, which took place from exhaustion.

#### METHOD OF RUPTURING THE CAPSULE.

I prefer the use of a Bowman's needle as the first stage of the operation to any other method; it has the following advantages:—

(a) It is a very easy method and enables the surgeon to see clearly what he is doing. The iris is therefore in no danger of being injured. With a very moderate amount of skill a needle can be introduced into even the shallowest chamber without catching in this membrane.

(b) The laceration of the capsule can be effected without any need of haste, since at this stage there is no risk of an escape of vitreous, even should the patient attempt to squeeze the eye. The operator can make as large a rent in the capsule as he wishes, and can place it with ease in the exact position he fancies. This balances the advantages claimed for the capsule-forceps of removing a portion of capsule, for with a free, well-placed aperture the edges retract widely during and after the escape of the lens.

(c) The surgeon can confirm his diagnosis as to the nature of the cataract, for the needle in an experienced hand is practically a probe, and thus its use throws valuable light on the after stages of the operation.

(d) There is no angle for the lodgment of dirt, as there is in the cystitome and capsule forceps, and therefore sterilisation is more easily secured.

There are a few points of interest as to the method of needling, and as to the information which this proceeding affords. It is essential that the needle should be very sharp, and that it should have cutting edges.

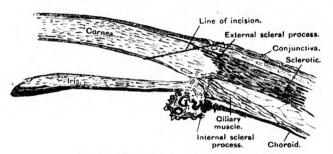
Into the cortico-nuclear cataract the needle edge sinks easily. As a rule, the capsule of a Morgagnian cataract readily bursts when incised, giving exit to a cloud of turbid fluid, which, though it may obscure the details of the anterior chamber, compensates for this disadvantage by very sensibly deepening the chamber, and thus enabling the operator to avoid cutting the iris. In a few cases one finds the Morgagnian capsule extremely tough. If so the needle must be withdrawn and the membrane lacerated with the point of the knife before the section is made. Such cases are, however, fortunately rare.

The feel of a hard cataract is characteristic, and in the endeavours to lacerate its capsule the lens may be seen to recede towards the posterior chamber. In such cases the greatest care must be exercised, so as not to apply undue force; the point of the needles should be introduced obliquely into the cataract, and the laceration effected by cutting forward with the edge of the needle into the anterior chamber. Should this precaution be neglected, and undue backward pressure made, the ligament of the lens may easily be ruptured, in which case a vitreous escape will probably occur.

<sup>&</sup>lt;sup>1</sup> I have ventured to quote freely here from my paper published in the *Indian Medical Gazette* in July, 1897.

#### THE SECTION.

One can only explain the large number of varieties of section employed by different operators on the assumption that the detail is not a very important one. My own preference is for a section in which the knife enters, emerges and cuts out along the line of junction of the external scleral process with the cornea. A glance at the diagram will show that the section impinges on the sclerotic only along this line, passing through the cornea alone in the rest of its extent; at the same time a slight rotation of the axis of the blade backwards before emergence enables one to pick up a conjunctival flap in any desired case; such an addition is advisable in the case of old people, or in those whose feeble nutrition suggests a fear of delay in the healing of the section.



Modified from Norris and Oliver's system.

There is one point, however, of undoubted importance, viz., that the section must be large enough. During the last few years up-country medical men have from time to time written to ask my opinion as to the cause of failures they have met with in cataract extraction, sending me notes of their cases. In a large percentage of these there has not been the slightest difficulty in saying that the eye has been lost owing to the section being too small; their subsequent experience has proved the criticism to have been well founded. There are objections to too large a section, but there are grave dangers in one which is too small. An intelligent use of the needle whilst tearing the capsule will indicate the size of section required. In large, hard, bulky cataracts I do not hesitate to use a section just under half the circumference of the cornea in extent, and I have never seen any serious results therefrom.

We come next to the much disputed question of the advisability of choosing the "simple" or the "combined" operation. This is a question of much importance, and in a recent tour through Europe I have been at considerable pains to ascertain the views of leading surgeons on it, and to watch their own practice in this respect. Speaking broadly, the exponents of the simple operation hold that it is possible to select the cases in which iris prolapse is unlikely; their indications vary, but may be summed up thus: Given a patient in good health, not broken by age, free from any cause of straining, with a healthy eye, whose chamber is deep and whose pupil is active; given, too, good nursing, whereby the patient may be "immobilised" (in other words, saved all need of active muscular effort) for twenty-four to forty-eight hours;

given such conditions, and you may safely dispense with iridectomy.

There are very few advocates of the "simple operation" who, speaking from a large experience, will deny that they meet with a non-negligible percentage of prolapse, and with a farther quota of "displaced pupil." I do not deny that small series may be insufficient to show this factor. I have it on the best authority that Prof. Schnabl, of Vienna, has several times gone back to the "simple method. attracted by its advantages, and has as often abandoned it, owing to the occurrence of prolapse after a run of encouraging cases in which he had successfully escaped that complication. My own experience in the first 1,200 or more cases I did was very similar. A long run of cases in which no prolapse had occurred would be rudely broken by a painful percentage of prolapse. Several well-known surgeons have told me that their experiences has coincided with my own in this respect.

There is an important point which calls for notice before we proceed further. It is that the European surgeon works under conditions which we in India do not enjoy: I think that I might safely class most "tropical" eye surgeons with ourselves. We labour under the disadvantage that we cannot possibly effectually immobilise our patients after operation. To begin with, we have not the highly-trained nursing staff requisite for the purpose, and even if we had, the native would not submit kindly to the irksome control imposed. I am not speaking only of the coolie and the pariah, but I include the high caste and intelligent educated native, and I speak after having operated on a large number of the latter, both privately and in hospital. One meets with an occasional exception, but such do not affect the rule. Be it remembered, too, that the operation for cataract is a painless one, that the patient is otherwise in good health, and that even in Europe and with the best of nursing, the patient requires constant watching to save him from the consequences of his own indis-

To appreciate the importance of the above remarks, we must first consider the causes of iris prolapse after cataract extraction. These may be divided into (1) predisposing, and (2) exciting.

Under predisposing causes I would class any factor leading to an impairment of the active contractility of the iris. Such a lesion may be present and recognisable before operation, or may be produced by over-stretching or tearing of the membrane during operation.

Under exciting causes we may class sudden movements of the patient after operation, and all causes which lead to straining. Such are the very conditions which good nursing controls for us, and which in India we find it so hard to guard against.

It is generally accepted that an iridectomy prevents prolapse of the iris by providing a safety-sluice through which the aqueous can escape when the section ruptures. If this were the whole of the explanation, I venture to think that the Indian patients who sit out in the compound discussing the details of the morning's operation with their fellows would suffer from prolapse much more frequently

than they actually do. There is undoubtedly another element in the case, viz., the "tone" of the iris. If this membrane, by virtue of its unimpaired activity, lies back in its usual position against the lens, the posterior chamber is reduced to its usual small proportions, and there is, accordingly, comparatively little "aqueous" dammed up behind it; hence it is less likely to be carried outwards by the rush of fluid when the chamber bursts; furthermore, its own muscular tone tends to keep it in its usual place, and does not allow every escaping stream to carry it up like a bellying sail.

When, on the other hand, the iris tone is lost, each outward rush of fluid dammed up in unusual quantity behind it acts on it at an advantage, by virtue of its position, and tends to carry the membrane before it,

and so cause prolapse.

Many surgeons, recognising the risk of damage to the iris during operation, recommend a careful inspection of the pupil after delivery of the lens, with a view to the performance of iridectomy then, if the pupil shows any tendency to be displaced upwards.

Apart from the fact that iridectomy is hazardous after the lens is "out," I have not found this means of diagnosis satisfactory, since a perfectly round pupil, under the quiescent conditions prevailing in the empty chamber just after the operation, is not a guarantee against prolapse under the stress of a sudden rupture of the section when the chamber has had time to fill.

A valuable side-light on this lack of iris-tone can be obtained by considering a class of cases familiar to many cataract operators. I refer to those cases in which prolapse of the iris, not present at first, becomes slowly established during convalescence. A careful examination will reveal that these are cases in which a want of firmness in the section permits of a steady though imperceptible outflow in its direction; the iris, wanting in tone, becomes gradually drawn up into

the wound and impacted therein.

Whilst many surgeons with European experience are at variance as to the advisability of omitting the iridectomy, I have not met one who would advocate the performance of the simple operation under the conditions we meet with in India. We cannot immobilise our subjects, and our risks are consequently disproportionately great. Such considerations have led me to adopt the combined operation as my routine in the last 800 cases I have operated on for the removal of the lens, and with very satis-In a series of 500 consecutive factory results. operations for primary cataract, I find that in 484 an iridectomy was performed, and in twenty-one of these there was some measure of iris prolapse, i.e., in 4.33 per cent. Of these nineteen recovered with good and two with poor vision. It is further noted that the symptoms of prolapse were not so severe as those met with in that complication after the simple operation. Again, in a later series of 250 consecutive cases of extraction for primary cataract, in which great attention was paid to the thorough replacement of the iris edges by means of MacKeown's irrigator, only six showed any impaction of the iris margins, and in only two of these was it necessary to remove the impacted edges and replace the iris. The percentages here work out at 2.4 per cent. for

the prolapses, and 0.8 per cent for subsequent interference. Great care was exercised in both these series to avoid overlooking any impaction of the iris,

however slight.

As to the objections commonly urged against the use of an iridectomy in cataract extraction, I cannot find, after carefully comparing the results of the two operations in opposite eyes of the same subject, that the average of visual result is better after the simple than after the combined operation; nor can I concede that mobility of the pupil is lost after the combined operation, for such is not the case: probably it is somewhat impaired, and this impairment may lead to some loss of post-operative accommodation, but the last-named condition is so seldom met with that this hypothetical loss need not much concern us. As to discomfort from the coloboma admitting an excess of light, I have seldom met with complaints from this defect, since I endeavour to make my iris-section narrow; the coloboma is further covered by the upper lid. From the surgeon's point of view the result looks less pretty after iridectomy; but need we consider this?

## THE REMOVAL OF CORTEX AND THE TOILET OF THE WOUND.

The irrigator invented by MacKeown, of Belfast, and described by him in his interesting and instructive work on the "Treatment of Immature Cataract," has been used by me over 800 times for mature and immature cataracts. It is sufficient to remove the nucleus of the opaque lens by expression, and all else can be easily and safely effected by irrigation. Cortex of all kinds, whether flocculent, brittle, doughy, or glutinous, can be washed out in toto; the chamber is cleansed by means of a flow of sterilised saline solution, of blood, of debris, and of accidentally introduced and septic matter; lastly, the iris is replaced with an ease, certainty, and safety that has no equal in instrumental interference.

On the third day a large proportion of the eyes show a clear black pupil, and secondary cataract is much less common than it is with the ordinary methods of

clearing the chamber.

I find that in 250 consecutive cases (in only one of which irrigation was omitted) capsulotomy was called for in nine for the results of cortical matter left behind, and in another series of 500, 460 of which were irrigated, only eleven required capsulotomy.

The even hydrostatic pressure of the aseptic fluid has the additional advantage over other methods that it is attended with a very low vitreous-casualty; the reasons for this are self-obvious. I find that in a series of 500 cases with 460 irrigations, vitreous escape only occurred in ten cases (or in 2 per cent.), while in the 250-series the actual escapes fell to three (or 1.2 per cent.).

When care is taken to sterilise the solution used, no fear of introducing a septic element need be entertained, but it will be obvious that if simple and easily carried-out measures are neglected, the gravest con-

sequences may follow.

#### ANTISEPSIS AND ASEPSIS.

Few surgeons will disagree as to the advisability of securely sterilising all instruments save the knife

and needle by boiling, or better still, by steam. The two instruments named are harder to sterilise because their points and edges are so easily damaged, whereas it is essential that they should be as sharp as possible. I have tried boiling and steam (most carefully applied), carbolic lotion (1:40), absolute alcohol, and a variety of other antiseptics, and I find that every one of them damages these sensitive instruments to such an extent as to introduce a definite element of danger into the operation. In my last 800 cases I have used a method of cleaning the knife and needle founded on some unpublished experiments kindly communicated to me by a friend, This gentleman took a Weiss's knife fresh from a cataract extraction, and after washing it carefully in sterilised water, rubbed it clean with sterilised absorbent wool; he then endeavoured to obtain cultivations from the blade, with the result that he found his sterilisation had been most satisfactory. most satisfactory. Acting on this I cleanse my knife carefully after each operation with chinosol solution (1:3000), and then wipe it dry with sterilised absorbent wool. The needle is similarly treated. The results have been very satisfactory. cases there were five septic cases (2 per cent.), in four of which perception of light alone remained, whilst in one vision was lost. A careful study of the cases renders it improbable that the infection was in any case due to the knife, there being other more likely sources of the mischief. Those of us who have done much cataract work in India know how hard it is to keep down our septic list amongst a people who not infrequently deliberately raise their bandages to rub the recently operated eye, or to show it to a friend. It has not seldom been my lot to have all my bandages removed by a foolish patient. One man, in spite of all remonstrance, removed every stitch of clothing, including his bandages, and sat under the tap, as regularly as the sun rose; he did excellently in spite of this, but such vagaries render the attainment of a perfect asepsis highly hypothetical in the East.

For the eye itself and for irrigation of the conjunctival sac I use chinosol solution (1:3000), made from boiled water, but I lay more stress on the asepticity than on the antiseptic action of my solutions, for I have been led to gravely doubt whether one does not do more harm than good by striving to antisepticise a membrane which is so intolerant of interference as the

conjunctiva.

## MARKING OF THE TONGUE AN EARLY SYMPTOM OF ANKYLOSTOMIASIS.

By A. B. Duprey, M.R.C.S., L.R.C.P.

Colonial Assistant Surgeon, St. Lucia; late District

Medical Officer, Grenada.

THE peculiar marking of the tongue in ankylostomiasis described by Dr. Delamere in the issue of June 16th of the Journal of Tropical Medicine is a very common occurrence among immigrant coolies of nearly all ages. I have had frequent opportunities of noticing these marks on their tongues, but never thought of associating them with the condition known as ankylostomiasis. On the contrary,

I have always ascribed these markings to a totally different origin, namely, a staining of the mucous membrane of the tongue, due to a favourite food which all coolies from India, young and old, are in the habit of using, when not only their tongues become discoloured, but their teeth are invariably stained of a brownish or of a purely black colour. A coolie on being asked why it is their tongues and teeth are always more or less discoloured, stated that it was due to their habit of eating the fruit and chewing the leaves of a particular plant, the name of which is pan or phan. This pan or phan is a creeper, and is very common in the West Indies, being usually found wherever there have been immigrant coolies, who, I believe, originally introduced the plant. The creeper bears a fruit varying in size according to the species, and is somewhat pear-shaped. The larger fruit generally tapers below in a long and round-pointed apex. Its outer surface is tuberculated, the tubercles being smooth and triangular, and are arranged in parallel longitudinal columns, a narrow smooth groove intervening between each column. The fruit, when ripe, is of a bright yellow colour, and on section discloses a red pulp; the pips are round and red and lie embedded in meshes of the pulp, somewhat after the style of a water-melon. It has a sweetish, nauseous taste. This fruit when eaten stains the mucous membrane of the tongue and the teeth a yellowish-red, which subsequently turns the tongue and teeth of a brownish or blue-black colour. The leaves are bitter or are said to be so, and are chewed for its supposed preserving virtues. marking of the tongue I really believe to be due to this phan, and I presume that the reason why it is seen in patches and streaks is that the brown stains. which are not permanent, fade away in a somewhat irregular manner.

The condition recognised as ankylostomiasis is an exceedingly common one in the West Indies, and are chiefly to be found among the native children and youths of the labouring classes. It is mostly due to the inveterate habit of eating dirt or other filth, such as rags, paper, slate, ashes, finger-nails, &c. Such instances of perverted appetites are to be met with commonly in all the islands. In Grenada there is a red-earth which the children are particularly fond of eating, and which is said to possess a somewhat sweetish taste. The anæmia brought on by this babit is a perfectly hopeless condition to deal with, so that positively "They pale, sicken and die." It is the same condition known under the name of ankylostomiasis, but their tongues do not present the markings so ably described by Dr. Delamere. If these brown and blue-black stains should really be an early sign of ankylostomiasis, then I submit that in both classes of patients, viz., coolies and natives alike, the markings should be present, for in that case it would prove beyond a doubt that the marks are not produced by the juices of this phan which the natives of India alone are so fond of chewing.

I have seen coolies in the Windward Islands who may be said to be more "creolised" than those, for instance, of Trinidad or British Guiana, where immigration still exists, and who are not actual dirt-eaters, but whose condition of anæmia is brought about by

a habit of eating raw rice. It is significant that this habit is acquired in the process of washing the rice, which the coolies do thoroughly, going through several washings until the rice is perfectly white. While thus engaged, half a handful of the clean rice is thrown into the mouth and eaten, and thus the habit of raw rice eating is imperceptibly acquired.

In watching this process as I have done, one would think that any ova of the ankylostomes which may be sticking to the grains of rice are washed away, but it is possible that while the habit strengthens, less care is taken of the cleansing process, and the grave consequences of ankylostomiasis result. These "creolised" coolies, being more in touch with the native labourers, have long lost the habit of chewing the phan, hence their tongues and teeth are not discoloured.

I have elsewhere described a very early sign of the condition known as ankylostomiasis, and one which may be detected before any palpable symptom of anæmia develops itself, namely, commencing atrophy of the skin consequent upon a condition of general innutrition. This symptom is not very surprising when one comes to think of it, for it is one which would naturally be expected from a knowledge of the pathology of the condition. Any one who has performed post-mortem examinations on subjects of ankylostomiasis cannot help observing the general innutrition and degeneration of the organs and tissues. In the living patient the skin shows this condition of innutrition in a very early stage of the disease.

One would naturally suspect ankylostomiasis in a coolie who comes complaining of palpitation and shortness of breath, though no other sign of anæmia be apparent, since one knows that almost all coolies are geophagists; but take a native child whose mother says is suffering from "Heart-beating and quick breath," and in whom no symptom of anæmia or other disease can be detected, the early sign of innutrition of the skin becomes a valuable means of helping to a diagnosis. In fact, just as the nature of the pulse furnishes us with a valuable index to the working condition of the circulation and other internal derangements, so do the innutrition and peculiar loss of firmness and tone observed in the skin in early ankylostomiasis lead us to form a fairly accurate idea as to the state of the organs and tissues, thus suggesting other means of examination in order to arrive at the true nature of the disease.

SOME UNUSUAL FACTS DISCOVERED DURING THE Examination of Malarial Blood.-G. B. Mariotti-Bianchi, while examining the blood of a patient who had never previously had an attack of malaria, found that abnormal conditions prevailed. The annular form of the parasite was present, and also a few crescents, but, in addition, adult forms were seen in the circulating blood. The author also had the unusual experience of actually witnessing the rupture of a blood-corpuscle and the exit of the crescentic forms.—La Reforma Medica, July 12th, 1902.

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#### THE

## Journal of Tropical Medicine

SEPTEMBER 1, 1902.

## British Medical Issociation.

#### SECTION OF TROPICAL DISEASES.

THIRD NOTICE. Friday, August 1.

#### YELLOW FEVER.

I.—James Cantlie, M.B., F.R.C.S., Surgeon Seamen's Hospital, London.

In opening the discussion on yellow fever Mr. Cantlie drew attention to the unsatisfactory term "yellow" as applied to any fever. So many ailments were attended by fever and "yellowness" that a more scientific nomenclature appeared advisable. He suggested "hæmatogenous jaundice."

Attention was drawn to the excellent work done in Cuba recently by the U.S. Army Commission in connection with the etiology and epidemiology of yellow fever. The result of these investigations were:

(1) That no specific bacterium or protozoan of any kind was present in the blood, tissues, or excreta of

yellow fever patients.

(2) That the blood of yellow fever patients injected into healthy (non-immune) persons caused an attack of yellow fever. The specific agent is therefore in the blood.

(3) Blood taken from a yellow fever patient and defibrinated, or diluted and passed through a Berkefeld filter, and the remaining serum injected into the veins of a healthy person caused yellow fever. The specific agent is therefore in the blood serum, and is either a germ which is ultra-microscopic, which cannot be excluded by a Berkefeld filter, or it is non-bacterial and in all probability a toxin.

(4) Yellow fever is not spread by fomites. This was definitely tested for several weeks by allowing healthy (non-immune) persons to sleep on mattresses and pillows and in pyjamas and under sheets and blankets soaked in yellow fever excreta and vomit. None of the persons so exposed contracted yellow fever.

(5) The mosquito—Stegomyia fasciata—by its bite conveys yellow fever from the sick to the healthy. This was ascertained by allowing mosquitoes which had fed on yellow fever patients to bite healthy persons, when yellow fever appeared amongst them after certain definite periods. In the room in which the experiment was made other persons protected by a mosquito-proof netting slept, and in no instance did the disease spread to others.

(6) The infected mosquitoes could not inoculate healthy persons with yellow fever until twelve days after they had become infected. This fact would point to a germ rather than a toxin as being the specific

agent in yellow fever.

Mr. Cantlie drew attention to the fact that many other diseases such as blackwater fever, bilious remittent fever, bilious typhoid, &c., present many signs and symptoms akin to yellow fever. In Egypt, during the Napoleonic occupation, Professor Sandwith states that the "typhus bilieux" existing in Egypt was designated a variety of yellow fever. It is possible, therefore, that yellow fever exists much more widely than at present believed.

II.—George C. Low, M.B., C.M.Edin., Cragg's Research Scholar, London School of Tropical Medicine.

THE DIFFERENTIAL DIAGNOSIS OF YELLOW FEVER AND MALIGNANT MALARIA.

Clinically there is difficulty in diagnosing yellow fever from pernicious forms of malarial fever. have many signs and symptoms in common, notably: The facial appearance; the condition of the tongue and skin; the temperature and its relations to the pulse; albuminuria; the epigastric pain and vomiting; hæmaturia; the nervous symptoms. As a means of ultimate diagnosis one has to rely on the microscope. Post mortem the diagnosis is simple: malaria is at once recognised by the presence of malarial pigment, by the recognition of the characteristic parasites in the brain, spleen or gastric mucosa. It is in the early stages of an epidemic that appeal must be made to the microscope; for later on, when the epidemic is at its height, the rapid spread, the high death-rate, and the persistent occurrence of groups of symptoms in a large number of cases from the same area, indicate clearly that yellow fever is present.

#### Discussion.

Patrick Manson, C.M.G., F.R.S., LL.D., warned observers against coming to too hasty a conclusion

from the experiments just published by the U.S. Army Commission. There might be, although he did not say there were, flaws in their methods of investigation, and markedly in the matter of the extent of their researches in regard to the absence of a germ of any kind in the filtered blood of yellow fever patients; he observed that the blood experimented with had been drawn from one patient only.

This was liable to beget fallacy.

L. W. Sambon, M.D. (Naples) thought that the diagnosis between yellow fever and malaria will be more simple when blackwater fever is separated finally from the intermittent fevers with which it is at present associated. He pointed out that in blackwater fever the vomit is hæmatogenous, the jaundice early, and hæmoglobinuria prevails—conditions which do not obtain in yellow fever. The existence of blackwater fever on the West Coast of Africa, Dr. Sambon believes, is largely responsible for the idea that yellow fever ever prevailed there.

W. T. Prout, M.D.Lond. (Sierra Leone), said

W. T. Prout, M.D.Lond. (Sierra Leone), said that neither his predecessor in office on the West Coast, nor in his own experience, had he ever seen a case of yellow fever on the West African coast. In all probability if the disease ever occurred there the cases were imported thither from the West Indies.

#### MALTA FEVER.

I.—P. W. Bassett-Smith, R.N., Lecturer on Tropical Diseases, Haslar, sent a paper on:—

"The agglutinating properties in the blood in cases of Mediterranean Fever, with special regard to prognosis; remarks on other blood changes and reactions during the course of the disease."

During the past two and a half years 196 cases of Malta fever were admitted to the Royal Naval Hos-

pital, Haslar.

The agglutination of the micrococcus melitensis, when brought in contact with dilutions of blood of patients suffering from Malta fever, is more marked than in the case of typhoid, as it commences on the fifth day and endures at times to one and a half years.

From observations made by Dr. Bassett-Smith it appears that in acute, chronic and convalescent cases, the bactericidal power of the serum against the specific organism of Malta fever is very slight, very much less than that usually of healthy individuals who have never suffered from the disease. If this procedure gives any adequate estimation of the immunity of the subject, then those who have lately recovered from the disease are less able to resist the invasion of the organism if introduced, and therefore more prone for a period to re-infection. If this is so, men who have lately recovered from an attack should not return to the endemic area for some time. The necessity also for early invaliding becomes apparent. In thirteen cases examined, as to the phagocytic power of leucocytes, the average organisms found inside the polymorphonuclear leucocytes were few in cases of Malta fever, whereas in the controls of normal blood they were always higher; it would therefore seem that not only is the bactericidal power of the blood low, but that also the phagocytic properties of the leucocytes are diminished.

### II.—BRIAN MELLAND, M.D.Lond. MALTA FEVER IN THE CANARIES.

In the Canaries the term typhoid fever and gastric fever are both in use; the latter, signifying gastric remittent fever, is but one of the names given to Malta fever. It is doubtful whether malaria exists at all in the Canary Islands. It is only since 1897 that Dr. Melland recognised the prevalent fever of the islands as Malta fever. The disease, however, does not seem so virulent in the Canaries as in the Mediterranean, and in quite 50 per cent. of the cases the fever lasts only two or three weeks. A fourteen-day fever is common, and it is apt to be confounded with acute rheumatism, influenza of the abdominal type, malaria, and abortive or fourteen-day typhoid. Another type is the five-week type; this form may readily be mis-taken for typhoid. The long undulant and severe type of Malta fever, with three or more separate attacks separated by intervals of normal temperature, does not exist in the Canaries in more than 10 per

The mode of spread is obscure; those who have lived long in the endemic area are most likely to contract the disease. The infection is no doubt often inhaled with dust, and many of the country villages and isolated farms seem more dangerous than the paved town of Las Palmas. In the form of the disease met with in the Canaries the spleen is less commonly enlarged; joint pains are rarer. The disease in Canary seems in bad cases to partake of the type of ulcerative colitis.

#### Treatment.

Liquid diet (milk) should be administered at first; the Spaniards often treated the ailment with purgatives—calomel, a grain every eight hours—and a single large dose of ipecacuanha is often useful. Bismuth, salol, benzol naphthol are given six hourly; and the colon is washed out daily with one litre of warm boracic solution.

III.—JAMES A. HISLOP, L.R.C.P., L.R.C.S.Edin. THE GEOGRAPHICAL DISTRIBUTION OF MALTA FEVER AND THE VALUE OF SPLENIC ENLARGEMENT AS A TEST OF MALARIAL INCIDENCE.

From experiences gathered in Assam, Dr. Hislop comes to the conclusion that Malta fever exists there. Out of eleven cases of fever, selected more for a continuance of fever than for any undulatory character, ten gave a well-marked reaction to Malta fever. In many of the "fever" cases the splenic enlargement was enormous-a condition usually attributed to malaria-but Dr. Hislop is of opinion that the spleen enlarges in "fever" from causes other than malarial—a fever in which quinine has no effect.

IV.—CHARLES A. BENTLEY, M.B., C.M.Edin. KALA-AZAR AS AN ANALOGOUS DISEASE TO MALTA FEVER.

In this paper Dr. Bentley publishes some "Preliminary Notes of an Investigation, and some Discoveries regarding the Nature of the Condition known as Kala-azar." He has come to the following conclusions :-

(1) Kala-azar is neither malarial fever, benign or malignant; nor is it any form of malarial cachexia, or post-malarial cachexia. It may, however, be complicated by a coincident malarial infection.

(2) Kala-azar is a distinct disease, consisting of an initial attack of irregularly intermittent, remittent or continued fever; this is followed by recurrences of a similar nature in the first stage, by a nearly continuous fever of a low type in the second stage, the whole together constituting a febrile affection of

long duration.

The wide divergence between kala-azar and malaria has been frequently noted, and the idea that it is non-malarial in origin is no new one. atypical periodicity of kala-azar serves to distinguish it from malaria; the high death-rate, the intractability of the disease to quinine, the communicability of kala-azar, the absence of parasites and pigment, and the existence of low fever in the later stages of the disease, serve to distinguish it from malaria.

The serum test afforded positive evidence also to favour Dr. Bentley's opinion that Malta fever is present in the district in Assam in which he practises (the Borjalie Tea Estate, Tezpurp, Assam.)

EVERETT DUTTON, M.B.Vict., Walter Myers Fellow, Liverpool School of Tropical Medicine. NOTE ON A TRYPANOSOME OCCURRING IN THE BLOOD OF MAN.

Dr. Dutton, while staying at Bathurst, Gambia, during 1901, found in the blood of a man just returned from England, having been invalided home six months previously after an attack of fever, a flagellated protozoan belonging to the genus Trypanosoma. The subject of the disease had been in the Gambia for seven years, and except for slight malarial attacks had never been ill. In May, 1901, he fell ill, and although he had fever, no malarial parasites were found in his blood. The patient suffering from occasional rise of temperature, pulse, and respiration varied in frequency, the liver and spleen were somewhat enlarged and painful, the heart sounds were weak, and the patient complained of breathlessness and weakness.

The most notable features of the illness have been: (1) Its chronic course; (2) the general wasting and weakness; (3) the irregular rises of temperature, never very high, and of a relapsing type; (4) local œdema; (5) congested areas of the skin; (6) enlargement of the spleen; (7) constant increased frequency of pulse and respiration.

These signs and symptoms were present when Dr. Dutton showed the patient to members of the Section of Tropical Diseases, B.M.A. when they visited Liver-

pool on August 1st, 1902.—Editor.]

Dr. Dutton proposes to name the parasite which he has discovered the Trypanosoma gambiense.

GEO. A. WILLIAMSON, M.D.Aberd., Larnaca, Cyprus. BILHARZIA HEMATOBIA IN CYPRUS.

A native of Cyprus, aged 22, who resided in Morphon, in the north-west of the island, was found by Dr. Williamson to be the subject of bilharzia. The patient had never left his native village until eighteen months previously, when he went to Nicosia and enlisted in the Police. He remained there five months, and was then transferred to Larnaca, where he has resided up to the present time. The man had never left the island of Cyprus. Some six months before admission to hospital the patient began to pass blood, and noticed that the blood appeared with the last drops of urine; he had no pain, nor any difficulty in passing urine. Blood escaped every day, and some mucous discharge was also present when the blood came. The typical bilharzia ova were found in numbers in the urine.

#### Treatment.

Rest in bed and boracic acid and buchu internally. The blood and ova disappeared from the urine, but Dr. Williamson does not anticipate a permanent cure.

Dr. Bruno Galli-Valerio, Professor in the University of Lausanne.

CONTRIBUTION TO THE STUDY OF BACILLUS PESTIS: ITS CULTURAL AND MORPHOLOGICAL CHARACTERS AND ITS RELATIONS WITH BACILLUS PSEUDO-TUBERCULOSIS RODENTIUM.

Dr. Galli-Valerio finds that the morphological characters of the Bacillus pestis are cultivated at a temperature of 18° to 20° C. At 37° C. the bacillus may not grow on cultures at all, but at + 1° C. and — 5° C. are even slightly developed. Dr. Galli-Valerio describes the characters of the cultures of the Bacillus pestis on gelatin, on agar, on agar with glycerine and glucose, on sloped gelatinised ox serum, on sloped gelatinised pleuritic fluid, and on rabbit-serum, on potatoes, milk, broth, &c. He finds that the organism most closely resembling the plague bacillus is the Bacillus psuedo-tuberculosis rodentium (guinea-pig).

GEO. A. WILLIAMSON, M.D.Aberd., Larnaca, Cyprus. STATISTICS OF THE BLOOD EXAMINATION IN CASES OF MALARIA IN CYPRUS DURING A PERIOD OF TWELVE MONTHS.

Out of 503 cases of illness diagnosed as malaria in Larnaca, Dr. Williamson, during the period from February 1st, 1901, to January 31st, 1902, found parasites in 470, i.e., 94 per cent. The number of cases in the twelve months commencing February 1st, 1901, and ending Jan. 31st, 1902, were respectively 11, 9, 5, 6, 9, 101, 87, 94, 60, 24, 32, 32, the fewest number of cases occurring in April (5), and the maximum in July (101). The total number of the tertian form of fever amounted to 308, of which 107 were double tertians. The total number of quartan fever was 49, of which 7 were double quartan and 8 triple quartan.

L. W. Sambon, M.D., London School of Tropical Medicine.

REMARKS CONCERNING THE NOMENCLATURE, ETIOLOGY AND PROPHYLAXIS OF THE INTERMITTENT FEVERS.

An appropriate nomenclature is, according to Dr. Sambon, a necessity. Should a collective name be desired, intermittent fever might be retained or that of hæmocytozoal fever selected. The term malaria might be set aside; æstivo-autumnal is inappropriate. The re-instatement of the ancient names of semi-

tertian and sub-tertian used by Hippocrates and others has much to recommend it. The term "plasmodium" should be given up and the quartan, tertian and subtertian (æstivo-autumnal) classed in one genus and called respectively Hæmamæba Golgi, H. Vivax, and H. Laverani.

The fever-producing cycle of the parasite might be called the asexual or swarming stage. The mosquito stage might be termed the sexual or resting stage. Dr. Sambon dealt with the geographical distribution of the hæmocytozoal fevers and suggested a thorough investigation of the distribution of quartan fever.

Dr. Manson thought Dr. Sambon's suggestion a good one. Dr. C. W. Daniels considered a change in nomenclature would probably cause great confusion. Surgeon-Major Poole (I.M.S., retired) said he had seen cases of quartan fever in Bengal.

## The British Guiana Medical Annual for 1902.

NOTES ON MALARIA AND OTHER TROPICAL DISEASES DURING THE TOUR OF THE ROYAL COMMISSION ON MALARIA.

C. W. DANIELS, M.B.Cantab.

Medical Superintendent London School of Tropical Medicine.

It has been suggested by the editors of the British Guiana Medical Annual that a summary of the observations made in the course of my investigations in India and Central Africa might be of interest.

The main result was the complete corroboration of what, when I left British Guiana in 1898, was considered to be a mere hypothesis, the malaria mosquito theory. Thanks to Major Ross, I.M.S., I was able almost immediately after landing in Calcutta to observe the complete development of the Proteosoma, a bird parasite closely resembling the human benign parasite, in the mosquitoes, and was shown by him specimens of the developed human parasite in a mosquito's stomach, thus leaving little doubt remaining as to the similarity in the process of infection of man and birds by the malarial parasite and the Proteosoma respectively. The development of the human malarial parasites we were unable to trace though several species of mosquitoes were tried. One of these was an anopheles, and specimens sent home of this mosquito were described and named by Giles as Anopheles Rossii.

The weather was cold and we could not satisfy ourselves that climatic conditions were not in part responsible for our failure; but subsequently other observers have shown that this anopheles, even under favourable conditions, does not carry malaria.

In Africa one was at once struck by the large number of anopheles present and the rough general correspondence between the numbers of these mosquitoes and the liability to early infection with

Direct experiments to show which mosquitoes carried human malaria and the stages of development of the parasites were much delayed, as so few of the

cases of malaria developed crescents in large numbers. Numbers give the percentage of persons If repeated examinations are made, over 70 per cent. specified with marked splenic enlargement. alike of Europeans and natives, children and adults, Malaria in the great majority of cases of the control of the co after an attack of fever are found to have "crescents," but usually in very small numbers, one being found after prolonged search on one day, and perhaps for the next two or three days these examinations are negative. On numerous such cases I fed mosquitoes, but in no case were they infected. In May, 1899, out of four mosquitoes (Anopheles funestus) fed on a moderate "crescent" case, one was infected, but I had no further success till in November and December in the same year, when I had a patient with numerous crescents, and from him I infected twenty-seven of these mosquitoes and was able to trace the full development of the parasites. The mosquito used had, in August, 1899, been shown by the first Liver-pool Malaria Expedition to carry the parasite of quartan malarial fever, as one out of five fed on a patient with quartan parasites developed zygotes.

Some time was spent in determining the breeding places of mosquitoes in general, and particularly those of the genus Anopheles and Anopheles funestus. It was found that the permanent and constant breeding place was running water, and particularly the grassgrown shoals in and at the edge of rivers. In other places they were found only during the rainy season, or when the level of the subsoil water was high, or in a few large collections of water. Small collections soon become too stagnant for Anopheles funestus and some other anopheles to develop. These results explained well the local distribution of malaria in British Central Africa, but it was obvious that with different conditions as to rainfall and the character of the soil there would be a considerable alteration in the conditions, and that places which were of little importance in British Central Africa might with the heavier rainfall and waterlogged soil of places like British Guiana be of the greatest importance. The fairly frequent occurrence of anopheles larvæ in rivers has been discovered by Nuttall in England quite independently, but elsewhere this class of breeding place has received little attention. The absence of rivers in Barbados is the probable explanation of the absence of anopheles there.

As I had anticipated, the great majority of cases of malaria amongst the natives occurred in children. Post-mortem examinations were not possible, so that a repetition of my observations in British Guiana on the proportion at various ages with malarial pigment in the organs was impracticable. As an alternative I determined the number with enlarged spleens with the result that in the most malarial district no less than 68 per cent. of children under 2 years of age were found to have markedly enlarged spleens. In a less malarial district the proportion was much lower under 4, but higher over 4. The results in three districts are embodied in the subjoined table:—

	Highlands, 3,000 ft. or more	Level of Lake Nyassa, 1,500 ft. odd	Lower Shire River, 300 ft, or less
Aged 2 years and under	18.4	68.8	48.1
,, 2.4 ,,	31.5	45.1	57.1
" 15 " and under	26.2	11.5	13.7

Numbers give the percentage of persons at the ages

Malaria in the great majority of cases was due to the autumno-estival parasite. The parasites were found in all cases of this fever, and on several occasions in apparently healthy native children, but even amongst these close enquiry would often show that there had been some periodical symptoms, and there was evidence, not only that splenic enlargement resulted from these infections, but that death from The more pernicious access was fairly common. intensely malarial the district the higher was the

mortality in childhood.

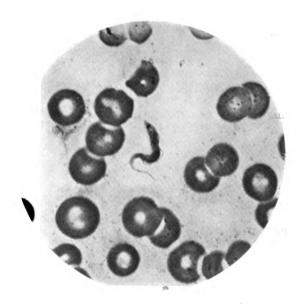
The incidence of malaria on children and the freedom of adults was more absolute than is the case in natives of British Guiana, probably because even the least malarial districts seem to be more malarial than the British Guiana littoral. In Georgetown it was fairly common for a newcomer to go two years or more without getting his first attack of fever. In the Central African Highlands the first attack is usually in a year, whilst in the most unhealthy districts few persons are resident for a month without getting an attack. As about a fortnight is required for incubation this would mean that, whilst in the most unhealthy parts of Central Africa fourteen days' exposure is nearly certain to mean malarial infection, two years is required in Georgetown for at all certain infection. In other words, the liability to malarial infection in some parts of Central Africa (Upper Shiré Valley) is more than forty-eight times as great as in George-

Nothing of any great importance was found as regards blackwater fever. Many of the cases of this disease are mild and the great danger is suppression of urine. Malarial parasites are not found during the attack either in the blood or in fatal cases in the organs. In all the cases I saw there had been malaria immediately before. No drugs appeared to have any specific action. Quinine, even in large doses, did not affect either favourably or otherwise the course of the disease. I saw nothing which convinced me that quinine had anything to do with the causation of blackwater fever. In some cases no quinine had been taken, and in the others there was no definite relation between the amount taken or the time it was taken and the time of the onset or the

severity of the disease.

In England as regards some points malaria is more readily studied than in the Tropics. The cases are not very numerous but can be more closely watched. The effects of the surroundings on the patient and his parasites are not complicated by the possibility of a fresh infection. With both tertian and quartan parasites symptoms occur in accordance with the number of parasites present. In many cases rest in a warm bed without treatment results in sufficient diminution of the parasites, so that no symptoms, i.e., no fever, occur. This condition can persist for an indefinite period, parasites being constantly present in small numbers without any fever or any tendency to a great increase in the numbers of the parasites. In such a patient, however, exposure to cold in some way enables the parasites to increase sufficiently to cause fever. The number of parasites necessary to cause

## JOURNAL OF TROPICAL MEDICINE, SEPTEMBER 1, 1902.



TRYPANOSOMA FOUND IN THE BLOOD OF A EUROPEAN.

Illustrating the article on Trypanosoma in Man, by R. M. Forde, L.R.C.P., L.R.C.S., Colonial Surgeon, Gambia, West Africa.



symptoms appears to be for most patients in England about 200-300 per cubic millimetre of blood.

During the summer of 1901 I paid a short visit to Sierra Leone. At that time there was very little fever there, but I was shown specimens of quartan and tertian as well as the autumno-æstival parasite by Dr. Prout

The conditions as regards breeding grounds of anopheles were very different from those in Central and East Africa. The rocky nature of the soil and the heavy rainfall which during the period I was there occurred daily, result in the formation of rock pools and pools in hollows which neither become dry nor stagnant, and in these anopheles larvæ breed abundantly.

Major Ross and Dr. Taylor had commenced destroying these places, and had made such progress as to demonstrate the practicability of rendering that town free from anopheles during the wet season. The expense was considerable, but not out of proportion with that of the benefits to be derived, even on

pecuniary grounds alone.

In the course of my wanderings I have not seen in any place any outbreak or attack of malaria which could not be readily accounted for by the now well-known facts that the gametes or sexual forms of the malarial parasite develop when taken with the blood into the mosquito's stomach and are finally injected by the mosquito into other men and after a variable period, usually one to three weeks, give rise to a sufficiently large malarial infection to cause "fever."

As far as I have observed there is no evidence of any other mode of transmission, but careful and prolonged observations are necessary to absolutely prove

a negative.

It may, however, be mentioned that in other branches of medicine, such as the development of tapeworms, when one method of infection is proved and explains all known facts about that tape-worm, action is taken for practical purposes as if that were the only important method, and I consider that malaria should be dealt with on the same lines and the known causes diminished or removed.

Attention in India and elsewhere has at length been drawn to the necessity of a critical examination of the value of enlargement of the spleen as a test of malaria, with the result that conclusions similar to those drawn in the *British Guiana Medical Annual* for 1895, from a comparison of the ages of incidence of enlarged spleen and malarial pigmentation of the organs, have been shown to hold good for the ages of incidence of enlarged spleen and the ages at which malarial parasites are most commonly present.

Malaria is most prevalent in childhood and diminishes in frequency in adults who have been exposed to malarial infection from childhood. Enlarged spleens amongst Indians, on the other hand, are most abundant at periods of life when malaria is rare.

This conclusion does not hold good for negroes; enlarged spleen and malarial parasites are alike

common in childhood and rare in adult life.

Of diseases other than malaria also met with in India, Central Africa, East and West Africa, filariasis has met with most attention. The F. nocturna has been shown to be carried by some species of anopheles

and panopletes as well as culex, but the discovery of importance is that by Low in England, and subsequently, but independently, by James in India, that Bancroft, junr.'s suggestion that the filarial embryos escaped through the proboscis and not, as was previously supposed, into water from the body of the mosquito is the correct one. Prophylaxis on lines similar to that for malaria is therefore requisite.

F. perstans has been shown to be steadily extending across Africa from west to east, and "sleeping sickness" is extending in a similar manner. It is of the utmost importance that it should be conclusively shown either that this disease does or does not occur amongst the aboriginal inhabitants of British Guiana.

Loos' discovery that the anchylostome embryo can penetrate the epidermis is a most important one. His sections leave no doubt that this occurs, and his discovery has been confirmed in India, and also on guinea-pigs in Liverpool. The proof that having penetrated the skin the anchylostome is able to reach the intestine is not conclusive.

That the anchylostome embryos cause an eruption, probably the "ground itch," of British Guiana, seems

to be established.

The granuloma of the pudenda, groin ulceration of British Guiana occurs on the West Coast of Africa, and after inspection of cases of madura foot, mycetoma, I can readily recall cases of that disease which I have seen in British Guiana.

Of diseases I had not previously seen in British Guiana, plague, cholera, sleeping sickness, blackwater fever, goundou and Malta fever, are of the most importance. Though the advances in the last few years have been great much remains to be done. Little more is known about dysentery than was the case a few years ago, and the part played by the amœba coli is undetermined, and the life-history of that protozoon not thoroughly known. Of parasites allied to human malaria, the Halteridium, the commonest of all Hæmosporidia, has not been worked out, and there is strong negative evidence that it is not carried by mosquitoes.

F. nocturna and F. inmitis are carried by mosquitoes, though there are differences in detail, but the carriers of F. perstans, F. Ozzardi, F. Demarquayi and F.

diurna are not known.

## LIFE-HISTORY OF THE ANKYLOSTOMUM DUODENALE.

By A. T. OZZARD, M.R.C.S.

DURING the last two years I have been able to completely confirm the experiments of Lieut.-Colonel Giles with regard to the life-history of this parasite. That this is an example of dimorphism or heterogenesis, I have not the slightest doubt.

I conducted my experiments on exactly similar lines

to those described by Colonel Giles.

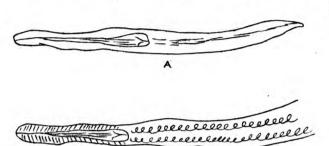
A small quantity of the dejecta, known to contain only the ova of ankylostomum of duodenale, is mixed with about three or four times its bulk of water, and poured on the surface of some *sterilised* river sand in a suitable vessel. The latter is covered over with a piece of glass. Every day a small portion of the

fæcal layer was placed on a glass slide, a smear preparation made, and examined under a low power of

the microscope.

At the ordinary temperature of the air here, the embryos usually hatched out within twenty-four hours. During the rainy season, however, when the temperature is lower, they sometimes take a week before hatching out.

In emerging from the egg the embryo measures roughly from  $\frac{1}{11}$  to  $\frac{1}{100}$  in. in length, by  $\frac{1}{800}$  in. breadth. At this stage they show little else than an intestine and esophageal bulb. They now increase rapidly in size and length and undergo numerous ecdyses. Giles says that ecdysis takes place roughly





RHABDONEMA INTESTINALE. A, Male; length of gullet = nearly whole length of body. B, Female; length of gullet = nearly whole length of body. C, Tail of male. D, Head of male. E, Adult female, with ova.

about twice in the twenty-four hours. And, as far as I could make out, this represents the case very fairly. The embryos developed into free sexually mature worms in from eight to ten days in my cases. The eggs in the free female worms are exactly similar in size and shape to those of the parasitic form. The size and shape of the free sexually-mature worms are, however, very different to those of the parasitic form: being very much smaller generally.

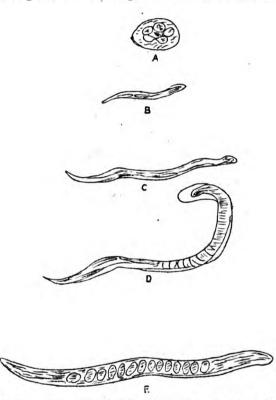
That there can be any confusion between the free sexually-mature forms of ankylostomum duodenale and Rhabdonema intestinale is impossible to any one

who will exercise a reasonable amount of trouble over the matter.

The two worms are quite distinct. In the free female forms of ankylostomum duodenale the ova are arranged in a single row and of an oval shape, usually from six to ten in number; whereas in the female Rhabdonema intestinale the ova are arranged in a double row and are somewhat rhomboidal in shape, with the exception of the lower six or so which are arranged in a single row and appear as if united in a chain.

Anguillula stercoralis develops only in foul water, and rapidly dies in decomposing fæces. The rhabdites of ankylostoma mature rapidly and best in the decomposing fæcal matter which is their natural habitat (Giles). I tried several times to cultivate the ankylostomum duodenale in water, but invariably failed.

Anguillula stercoralis comes to maturity in a very short space of time compared with that of ankylos-



ANKYLOSTOMUM DUODENALE (Free Stage). A, Ovum (segmentation). B, Embryo (2nd to 3rd day). C, Embryo (4th to 6th day). D, Embryo (7th to 8th day). E, Fully-developed female form (8th to 10th day).

toma. The former, in my experiments, developed within two to three days; whereas ankylostoma took at least eight to ten days, under the same conditions.

The size of the free adult ankylostoma duodenale in my specimens (dried, stained, ones) was roughly about  $\frac{1}{27}$  in. in length, by about  $\frac{1}{250}$  in. in breadth.

The diagrams are rough sketches from actual specimens in my possession, and are not mere reproductions from other drawings.

#### ANKYLOSTOMIASIS: THE CAUSE OF THE ANÆMIA IN.

By A. T. OZZARD, M.R.C.S.

IT will be noticed that Leonard Rogers, in his definition of ankylostomiasis, assigns as the cause of the anæmia produced "the long-continued small losses of blood through the gastro-intestinal mucous membrane caused by the presence of several hundreds of ankylostoma acting for many months."

Daniels and others, however, suggest that the

anæmia is really produced by means of certain toxines

elaborated by the ankylostoma.

Personally, I am inclined to agree with Rogers that the anæmia is caused by the actual loss of blood from the bites of the parasites. It is quite true that one ankylostome can imbibe but a very small quantity of blood; but the wound having once been inflicted in the mucous membrane may continue to ooze blood for some time subsequently to the falling off of the begorged parasite, and when it is a question of some hundreds of these parasites acting in a similar manner, I do not think it unreasonable to suppose that a considerable degree of anæmia should be produced thereby in the host.

An important point which appears to me to be in favour of the anæmia being caused by the loss of blood from the bites of the ankylostoma is this: that it is exceedingly remarkable to notice how very rapidly a return to normal is made when treatment with thymol has been successfully carried out. A patient whose mucous membranes are pearly white on admission to Hospital, a few days after a course of thymol will (provided the anemia is not too far advanced) show an extremely rapid return to the healthy reddish appearance which the mucous membranes should naturally possess. Now if the anæmia were due to certain toxines, the action of which on the blood would, I presume, be to cause a destruction or poikilosytosis of the corpuscles, I maintain that a return to a normal condition of the blood would involve a considerably longer period of time than that seen when thymol has been successfully administered.

## Current Miterature.

BLACKWATER FEVER AND MALARIA.—In this article C. W. Schlayer cites an interesting case in which the hæmoglobinuria was due, not to quinine, which the patient had taken with impunity during his stay in Africa, but to phenacetin, 0.75 gramme of which was taken. Owing to pleurisy being present, the diagnosis at first presented some difficulty. That the typical attack of blackwater fever was due to the phenacetin is proved by the disease setting in twenty-four hours after its administration, whereas no quinine had been taken for ten days previously. During the attack the treatment consisted in 0.5 gramme of quinine every three hours, and the results were highly satisfactory. This case was an instance of phenacetinhæmoglobinuria—a very rare condition.—Deutsche Med. Wochenschr., July 10th, 1902.

BLACKWATER FEVER.—The author of this paper, Dr. Reinhold Ruge, gives some valuable hints as to

the treatment of blackwater fever. He asserts that quinine enemata as recommended by Kleine are advantageous in their effect on the general condition of the patient. He is of opinion that the quinine prophylaxis is by no means always a preventive of blackwater fever, and he cites a case in which 3 grains of quinine caused an acute attack of hæmoglobinuria. impending attack of blackwater fever may be foreshadowed by a microscopical examination of the blood, which twenty-four hours before the attack exhibits polychromatophilic degeneration, with many macrocytes, microcytes, and "blood-shadows."— Deutsche Med. Wochenschr., July 10th, 1902.

MALARIA AND CANCER. — Statistics from Madeira are furnished by J. Goldschmidt with the view of contradicting Loeffler's theory that malaria and cancer do not co-exist in the same place. In the island of Madeira malaria is practically unknown, and carcinoma is of rare occurrence. It is strange in view of Loeffler's theory that carcinoma is not exhibited in a greater proportion in the population of this country. -Deutsche Med. Wochenschr., July 10th, 1902.

THE MECHANISM OF INTESTINAL INFECTION IN DYSENTERY.—According to L. E. Bertrand, the intestine, under certain conditions, is a closed vessel, and favourable to the production of dysentery. According to Virchow, rectitis due to constipation is the chief cause of dysentery, the intestine being practically closed. When opium and astringents are administered during the initial stages of an intestinal flux the intestine is prevented getting rid of the mucus, blood, and other contents, and being thereby placed in the condition of a closed tube is in the worst state possible as regards possibility of curing the disease. The only rational treatment is to promote evacuation; all other methods of treatment are accessory.-Revue de Médécine, July 10th, 1902.

ACUTE GASTRO-ENTERITIS, OR SUMMER DIARRHŒA OF INFANTS. - Margaret Taylor Shult recommends that if a child vomits frequently the stomach should be washed out, relief being usually afforded after only once doing so; if, however, the vomiting persists, minute doses of calomel will be found useful, as this drug allays the gastric irritation, cleanses out the intestinal canal, and is, moreover, a strong intestinal antiseptic. Rectal enemata are serviceable when the stools are small and malodorous. If nausea is absent, a dose of castor oil, or 1 to 10 grs. of calomel, should be given after flushing out the colon. Only cold boiled water should be given for twelve hours—no milk—to be followed by a liquid preparation of beef peptonoid. Nurses should bear in mind the fact that the ailment is of an infectious nature, and that therefore all the discharges and stools should be disinfected, the hands kept scrupulously cleaned, and the napkins boiled before being again used. - Journal of the American Medical Association, August 2nd, 1902.

CHOLERA.—The efforts of the sanitary authorities in the Philippines to suppress the cholera epidemic have been materially aided by typhoons. A second typhoon of the season visited the islands the last two days of July and cleansed Manila thoroughly.

The sea was forced into the canals and flooded the districts where cholera has been raging. The result was that there were only twenty-five deaths from the disease on July 31st, and the number of new cases was greatly reduced.—Med. Record, August 9th, 1902.

#### PLAGUE.

#### PREVALENCE OF THE DISEASE.

India.—The deaths from plague in India during the weeks ending July 26th and August 2nd numbered 1,459 and 1,902 respectively. The minimum mortality from plague for the current year seems to have been reached during the weeks ending July 12th and 19th, when the mortality from plague was recorded as 1,058 and 1,100 respectively. The disease is diminishing in the Punjab and increasing in the Bombay districts.

EGYPT.—During the weeks ending August 10th and 17th the fresh cases of plague in Egypt amounted to 5 and 3, and the deaths from the disease to 1 and 1, respectively. On August 17th 10 cases remained under treatment.

CAPE OF GOOD HOPE.—At Port Elizabeth, during the weeks ending July 20th and August 2nd, the fresh cases of plague were reported as 2 and 0, and the deaths from the disease 0 and 1, respectively.

Hong Kong.—In Hong Kong the fresh cases of plague returned during the weeks ending August 16th and 23rd numbered 12 and 12, and the deaths from the disease as 11 and 11, respectively.

MAURITIUS.—During the three weeks ending August 8th, 15th, and 23rd, 2, 0, and 1 fresh cases of plague were reported in Mauritius, and 2, 1, and 1 deaths from the disease, respectively.

QUEENSLAND.—The last case of plague occurred in Queensland on May 31st, 1902. During the outbreak of the disease the total cases of plague reported amounted to 81, of which number 25 died.

#### CHOLERA IN EGYPT.

During the weeks ending August 11th and 18th the cases of cholera reported in Egypt numbered 238 and 1,127 respectively. The deaths from the disease numbered 186 during the week ending August 11th, and 791 during the week ending August 18th. Although 150 cases were reported during the latter week in Cairo, a large number of these are really in villages outside the city itself. During the week ending August 18th 72 new localities have become infected by cholera. The chief outbreaks are in villages which depend entirely for their water supply on surface wells.

#### EXCHANGES.

Annali di Medicina Navale. Archiv für Schiffs u. Tropen Hygiene. Archives de Medicine Navale.

Archives Russes de Pathologie, de Médec. Clinique et de

Bacteriologie. Australasian Medical Gazette. Boletin de Medicina Naval.

Boston Medical and Surgical Journal.

Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology. British Medical Journal. Brooklyn Medical Journal. Caducée. Climate. Clinical Journal. Clinical Review. Giornale Medico del R. Esercito. Hong Kong Telegraph. Il Policlinico. Indian Engineering. Indian Medical Gazette. Indian Medical Record. Janus. Journal of Balneology and Climatology. Journal of Laryngology and Otology. Journal of the American Medical Association. La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal Medical Brief. Medical Missionary Journal. Medical Record. Medical Review. Merck's Archives. New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyclinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo.

Sei-i-Kwai Medical Journal.
The Hospital.
The Northumberland and Durham Medical Journal.
Treatment.

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Kingdom, unless specially desired and arranged for.

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5.—Correspondents should look for replies under the heading "Answers to Correspondents."

## The Journal of Tropical Medicine.

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### Original Communications.

REMARKS ON THE NOMENCLATURE, ETI-OLOGY AND PROPHYLAXIS OF THE INTERMITTENT FEVERS.

By Louis W. Sambon, M.D. (Naples). Lecturer to the London School of Tropical Medicine. NOMENCLATURE.

Our knowledge concerning the etiology of the intermittent fevers has attained such a degree of exactness, that I think it is time we should reject from the nomenclature applied to these fevers those terms which express ideas totally at variance with the ascertained facts. The need of an appropriate terminology is so greatly felt that new names are constantly being suggested both by physicians and

The Italian term MALARIA, which means noxious air, is the one now most generally used in English medical literature to denote the various intermittent fevers collectively. It was possibly suggested by the ancient term Mephitis, name of an old Roman deity which personified noxious effluvia. I think it would be advisable to abolish it, as the French have done, because it expresses and perpetuates a wrong theory, which is, unfortunately, still prevalent amongst the uninformed. The old popular name Ague, from the French term aigu, which means acute, has already gone out of use. Paludism is another foreign term occasionally met with in English medical literature; it was popularised by Laveran, but had been pre-viously used by other French writers as a synonym of Fièvres palustres. Its English equivalent is the obsolete expression, Marsh Miasmata.

Should a collective name be deemed necessary, we might surely continue to use the old appellation of INTERMITTENT FEVERS, which expresses the dominating feature of these fevers, namely, their periodicity; or we might call them Hæmocytozoal Fevers, thus designating by one term their causative agent and its anatomical habitat.

Major R. Ross<sup>2</sup> proposed the denomination of GNAT FEVERS. This is evidently unsuitable, because whilst, so far, only a few species of a single genus of the vast family of Culicidæ (gnats) are known to foster and propagate the hæmocytozoa of the genus Hæmamæba in man, other similar parasites of the genus Piroplasma, in dogs and cattle, are disseminated by ticks.

The hæmocytozoal fevers have also been called PERIODIC, RHYTHMICAL and PAROXYSMAL FEVERS, but the equivalent appellation "intermittent fevers" preferable, and has the great advantage of being already very generally used.

Considering the intermittent fevers individually, we find that the ancient names for three of these fevers have been retained throughout medical literature; they are: Quotidian, Tertian and Quartan; the other, the Semi-Tertian (ἡμιτριταΐον) of Hippocrates, of Celsus, of Galen, of almost all the ancient physicians, was dropped long ago, evidently on account of the confusion which prevailed about this more obscure and fatal disease. Colin and Sternberg proposed to call it REMITTENT FEVER, but this type of fever is really intermittent and only apparently remittent when the intermission is masked by the protraction of its "hot stage." In 1866, Prof. G. Bacelli proposed to call it Sub-Continuous Fever. In 1889, Marchiafava and Celli, in publishing their important observations on the parasitology of this disease, suggested the name ÆSTIVO-AUTUMNAL FEVER, because they noticed that it prevailed during summer and autumn in the Roman Campagna; but this fever has a very wide distribution, and, in tropical regions, it is not limited to the seasons implied in the above name. Prof. Koch recently proposed the name TROPICAL MALARIA, but this appellation is doubly unsuitable.

<sup>&#</sup>x27; Read at the Manchester meeting of the British Medical Association, August, 1902.

<sup>&</sup>lt;sup>2</sup> Report of the Liverpool Malaria Expedition to West Africa, August, 1899.

The disease, although very prevalent in certain tropical regions, is by no means confined to the Tropics, and the term malaria, for reasons already stated, should be discarded. I think that the ancient name, Semi-Tertian, or better, Sub-Tertian, should be reinstated. It is cognate to those of the other intermittent fevers, it indicates the type of fever and at the same time its apparent irregularity, it commends itself on account of its simplicity, and has every right to be adopted in accordance with the accepted rules of scientific nomenclature.

Before proceeding to discuss the nomenclature of the parasites, because Prof. Laveran, and the French school in general, still hold them to be mere interchangeable varieties of a same polymorphous species,1 I deem it necessary to state that I consider the parasites of quartan, tertian, sub-tertian and quotidian as distinct species. In Italy, in Germany, in the United States of America, and in England, all authorities are now agreed in believing that the parasites of the various types of intermittent fever represent distinct species. Numerous facts in their morphology, lifehistory, geographical distribution, and pathogenesis strongly support the separate nature of these parasites, but the most convincing and irrefutable proof is that afforded by precise inoculation experiments. In fact, the inoculation of one type of parasite, either by means of the mosquito or by the direct inoculation of human blood from man to man, gives rise to the same type of parasite and to no other in the individual inoculated. I am fully aware that some old, careless experiments were, apparently, in favour of polymorphism, but all recent experiments, when scrupulously carried out, have proved the specific distinction of the hæmamæbidæ Those who still believe that the parasites of man. of the intermittent fevers belong to one pleomorphous species follow in the steps of others who, likewise, from lack of continued observation, denied the existence of species in Bacteria. About fifty years ago it was maintained that all sorts of weeds were produced from the seed of the wheat-plant, and people in other respects well educated and intelligent believed that this was possible, because these weeds sprang up in the spots where wheat had been sown!

The parasites of the intermittent fevers belong to the class *Sporozoa*, and to the order named *Hæmosporidia*, by Prof. Mingazzini in 1890, but, with Prof. Laveran, I prefer the term *Hæmocytozoa*, proposed by Danilewsky in 1885.

When Laveran first discovered the parasites of the intermittent fevers, he supposed that there was only one parasite, and that the perfect state of this parasite was represented by the microgamete, which he assigned to the vegetable kingdom, and to the genus Oscillaria under the name of Oscillaria malaria. But he soon abandoned this view and adopted the very general designation of Hamatozoon malaria.

Numerous other names have been suggested, such as Hæmatophyllum, Hæmatomonas, Cystosporon, Hæmoproteus, Plasmodium, Polymitus, &c., but they never

came into use with the exception of Plasmodium malariae, proposed, in 1885, by Marchiafava and Celli, from analogy with Plasmodiophora brassica, an amœboid endocellular parasite which causes the disease called "club-root," or "fingers and toes," in turnips and cabbages. The term plasmodium is perhaps the most inappropriate of all the names suggested for the parasites of the intermittent fevers. A plasmodium is a large, irregular mass of protoplasm containing many nuclei. It is composed of numerous cells which have coalesced and are usually enclosed in a common pellicle. The hæmocytozoa are mononucleated unicellular organisms and they never coalesce to form a plasmodium.

In 1890, Grassi and Felletti<sup>2</sup> proposed to divide the hæmocytozoa of man into two genera, for which they suggested the names Hæmamæba and Laverania. In 1899, Major Ross<sup>3</sup> suggested the term Hæmomenas as a generic name for the parasite of sub-tertian, but this term is excluded by the name Laverania previously advanced. Besides, should the division into two genera be retained, I think we could not find a more suitable term for the parasite of sub-tertian than that which records the name of the great savant who discovered it.

Personally, I do not see the reason of making a special genus for the parasites of sub-tertian and quotidian on account of the shape of their gametocytes, and I think we should call the former, with Labbé, Hæmamæba laverani, and not H. precox, as several authors have done, because the name H. precox was given by Grassi and Feletti to the pigmented quotidian parasite.

Having rejected the term malaria, it becomes necessary to alter the name of the quartan parasite, which is now called *Hæmamæba malariæ*, and I therefore suggest that it be called *Hæmamæba Golgii*, because it was Prof. Golgi, of Pavia, who, having made a special study of quartan fever, discovered that the different types of intermittent fever correspond to different species of parasites.

Like most unicellular organisms, no matter whether classed as Protophyta or Protozoa, the Hæmocytozoa present two different and alternating life-cycles. Considering these two cycles from the standpoint of human pathology, the one which is spent within the blood of the vertebrate intermediary host has been called the Endogenous or Fever-Producing Cycle; the other, which is spent within the body of the arthropod definitive host, has been called the Exogenous or Mosquito Cycle.

I think we might with advantage adopt for the denomination of these two cycles names that would apply equally well to other organisms, and thus draw attention to the analogy which exists between the dual life-cycle of the hæmocytozoa and that of other parasites belonging to widely-sundered biological groups. The fever-producing cycle might be called the SWARMING OF ASEXUAL STAGE, because during this

<sup>&</sup>lt;sup>1</sup>Dr. Billet, in a recent paper on the intermittent fevers of Algeria, though still holding that tertian and sub-tertian parasites are the alternating forms of a single species, admits that the quartan parasite is a specifically distinct organism.

<sup>&</sup>lt;sup>2</sup> "Contribuzione allo studio dei parassiti malarici." Atti dell' Accademia Gioenia di scienze naturali in Catania, vol. v., serie 4

serie 4.

3 "Life-history of the Parasite of Malaria." Nature, August 3rd. 1899.

stage the parasite goes on multiplying very rapidly by an asexual method of reproduction analogous to the vegetative growth of algæ and bacteria, or to the strobilation stage of Cestoda. The mosquito cycle, or, to be more correct, the arthropod cycle, might be called the Resting or Sexual Stage, because, in this stage, the process of multiplication is a sexual one, analogous to that which produces the resting stage of Protophyta, or the resting stage of Cestoda, and because the copula or zygote becomes encysted just like the copula (resting spores) of Protophyta.

In a paper read before the Royal Society on March 6th, 1902, Prof. Ray Lankester proposed that the SPOROZOITES, when first introduced into the blood of man by the anopheles, should be called Exotospores, because, from the pathological point of view, they have been formed outside the human body. And he proposed to call Enhamospores the gymnospores, which derive from the segmentation (schizogony) of the parasite (schizont or amœbula) in the blood of the infected human being, so as to distinguish them from the spores which are inoculated by the mosquito, and derived from a sexual process of multiplication. To me, the term exotospore seems inappropriate, and, indeed, it would be absurd to call the sporozoite exotospore, within the body cavity or salivary glands of the mosquito, where we see it exclusively. The term enhæmospore is good, but to avoid an unnecessary and confusing multiplication of names, I think we should adopt the word MEROZOITE, which, in the Coccidiida, is applied to the analogous fission product of the schizont.

#### FORMATION OF GAMETES.

The formation of asexual spores (merozoites) during the swarming stage of the hæmamæbidæ is analogous to the production of zoospores in various Protophyta. The conditions favourable to asexual multiplication are those which render the vegetative growth most active and produce an abundant formation of new protoplasm. But the actual stimulus to division is a slight check to the process of assimilation and growth. In many algae in which asexual spores (zoospores) are produced at night, the waning light and a lower temperature may be the necessary stimulus. Experimentally, a change from a strong solution of nutritive salts to fresh water will induce the formation of zoospores in plants, which would simply have gone on growing if left in the nutritive solution. hæmamæbidæ, the exhaustion of the nutritive supply within the enclosing corpuscle is, of course, the necessary cause of segmentation. Like many alge which penetrate the leaves of host-plants, or like other sporozoa which live in the cells of various hosts, the hæmamæbidæ penetrate the erythrocytes simply that they may gain the advantage of a quiet, protected place for their development.

The formation of gametes in the hæmamæbidæ is likewise analagous to the formation of gametes in the Protophyta. In both the stimulus to the formation of sexual cells is given by conditions unfavourable to growth. In the common blue-mould (Penicillium glaucum) found on bread, fruit, &c., the mycelium develops special branches (conidia) which break up into asexual spores. But when the excessive develop-

ment of the conidia is prevented by exclusion of air, sexual organs arise on the luxuriant mycelium. The formation of gametes is an adaptive provision for the preservation of the species under unfavourable conditions, while the formation of asexual spores is simply a process of continuance and expansion. By inoculating the merozoites of the hæmamæbidæ into a succession of susceptible hosts we might continue the asexual stage indefinitely. A good illustration is that of the aphides, popularly known as plant-lice. In a favourable summer the Aphides may produce as many as twelve or fourteen generations of female insects by parthenogenesis. At the beginning of the cold season they produce both males and females, and the fertilised eggs of the latter can resist a very low temperature, and are known as "winter eggs." Now, if the summer aphides that multiples by parthenogenesis were not exposed to the influence of cold, but kept in a constant summer heat, and at the same time supplied with suitable food, no males would occur, and the young would be uninterruptedly produced by parthenogenesis. In fact, Réaumur succeeded in producing artificially more than fifty parthogenetic generations in the course of three or four years, all descended from one another. Probably, in the hæmamæbidæ, as in the Protophyta, only a certain number of cells in each brood become gametes; possibly the number increases as the surrounding conditions become more unfavourable. If this be so, we need not speculate on possible latent forms which have not been observed, or ascribe parthenogenesis to the gametocytes, as Prof. Grassi has done to account for relapses. and relapse, in the intermittent fevers, are only clinical expressions of numerical fluctuations which occur in the successive broods of parasites in connection with conditions more or less favourable to their multiplication. In fact, we know that during latency the slightest change in the condition of the host (exposure to cold, fatigue, intercurrent disease) will give rise to a relapse.

We do not know how long the gametes can persist in the circulation; certainly, those which are not taken out of the blood by mosquitoes degenerate and disappear like Bladder-worms or the larvæ of *Filariæ* 

if not liberated within a certain period.

A careful, continued study of segmentation (number and size of spores, disposition of chromatin, &c.) in successive broads of first uncomplicated infections of tertian fever will most probably reveal the genesis of gametocytes.

## GEOGRAPHICAL DISTRIBUTION OF INTERMITTENT FEVERS.

Maps of the geographical distribution of "malaria" have often been published. In these maps, the range of the disease is usually represented by red paint uniformly brushed over all land areas between the annual isotherms of 30° N. and 70° S. The absurdity of such maps becomes at once obvious when we consider—

(1) That "malaria" is not a single disease, but a group of diseases caused by specifically distinct parasites, each one of which has its own peculiar distribution.

(2) That the intermittent fevers are strictly limited to swampy areas which are mostly found along river valleys, at the foot of mountains, and on coast districts.

When heat was considered to be the chief factor in the production of "malaria," the following law was formulated, notwithstanding all contrary evidence: " Malaria shows a progressive decrease both in extent and intensity from the Equator to the Poles, and beyond a certain limit does not occur either endemically or epidemically."1

Now we know that heat is not a cause of the intermittent fevers, that it has nothing to do with the severity of the malignant type (sub-tertian), and that, whatever may be its influence on the epidemic prevalence of these fevers, it is certainly subordinate to

many other conditions.

The recent scientific demonstration that the intermittent fevers are propagated by mosquitoes of the genus Anopheles, and, so far as we know, only by means of these insects, will help very much in the mapping out of fever stations, because, although the intermittent fevers may be absent in places occupied by mosquitoes known to be capable of fostering the specific parasites, they cannot extend beyond the distributional areas of these insects. Unfortunately, the geographical distribution of the various species of anopheles is as yet very imperfectly known.

The available information as to the prevalence and distribution of each one of the intermittent fevers is very scanty. We know that their distribution in many places is co-extensive, and, so far as our experiments go, we know that the same species of anopheles may foster the various parasites; yet there are marked differences in the seasonal prevalence and geographical

distribution of each fever.

In the summer of 1899, Drs. A. van der Scheer and J. Berdenis van Berlekom<sup>2</sup> had the opportunity of investigating an epidemic of intermittent fever which broke out in Middleburg (Zealand), where for thirty years this disease had never occurred; they found that it consisted only of cases of tertian.

In the Roman Campagna, quartan, tertian, subtertian and quotidian are all prevalent, but each fever observes its peculiar season and maintains its

usual distribution.

In Tropical Africa, sub-tertian predominates almost exclusively. Drs. Stephens and Christophers, both in Lagos and on the Gold Coast, found only the parasite of sub-tertian, and they examined the blood of 639 cases. Dr. Daniels, in Central Africa, found this parasite exclusively, in Europeans, natives and Indians. Cases of tertian fever are comparatively rare on the West Coast. On the East Coast, Prof. Koch found the Hamamaba vivax in 10 per cent. of all cases of fever. Quartan fever seems likewise very rare. Major Ross mentions it as occurring in Sierra Leone.

I am sure that a careful comparative study of the distribution and ecology of these fevers by competent observers would elucidate many obscure and important points in the life history of their respective parasites. Quartan fever is, perhaps, the easiest to investigate. It has a wide distribution, but its

Hirsch's "Handbook of Geographical and Historical Pathology."
<sup>2</sup> British Medical Journal, January 26th, 1901.

stations, or endemic centres, are very much scattered and strictly limited to certain localities which offer special conditions as yet undetermined. A classical example is that recorded by Trousseau many years ago. "Tours and Saumur, which are both situated upon the left bank of the Loire, would seem to be under the same climatic and telluric influences, yet in Tours we find only the tertian variety, while all the quartan cases which I have seen were in persons coming from Saumur, from Rochefort, or from some other region. One of the facts which made the deepest impression upon me was the following: Fourteen soldiers from Saumur came to Tours to testify at a court-martial; they had scarcely been ten days in the latter city when nine of them were obliged to go to the hospital suffering from quartan fever, the germs of which they had certainly contracted in Saumur, since all the fevers observed in Tours and its environs were of the tertian type.

While carrying out Dr. Manson's experiment in the Roman Campagna in 1900, Dr. G. C. Low and myself,\* examined every case of fever that occurred in the district of Ostia, but we found no cases of quartan, whilst at a few miles distance, near the convent of the Tre Fontane, there occurred several cases. In connection with this fact, I may mention that although we hunted daily for mosquitoes, we did not find one single specimen of Anopheles bifurcatus in the district of Ostia, but, at the Tre Fontane Prof. Bastianelli found several specimens of Anopheles bifurcatus, together with specimens of A. maculipennis, which were everywhere exceedingly abundant. ther the species of anopheles has anything to do with the peculiar distribution of quartan fever I am not prepared to say, but Profs. Bastianelli and Bignami state that whereas the experimental infection of A. maculipennis with tertian and sub-tertian parasites is comparatively easy, that with quartan parasites is very rarely obtained. They believe that this is on account of the scarcity of gametes in the blood of quartan patients, rather than to the insusceptibility of A. maculipennis for this particular parasite.

It is to be hoped that we shall soon possess records of careful experiments on the infection of many species of anopheles and other mosquitoes with the parasites

of the various intermittent fevers.

DERIVATION OF THE HEMOCYTOZOA OF MAN.

So far as we know, the parasites of quartan, tertian and sub-tertian are found in man only. Probably the reason of this limitation is that they have become specialised, like Tania saginata, Pediculus capitis, Phthirius inguinalis, and other parasites of man belonging to very different biological groups.

In recent years the blood of numerous animals has been examined for hæmocytozoa, and we have learnt that these parasites have a wide zoological distribution, but in no other vertebrate have been found the hæmocytozoa peculiar to man.

Several kinds of Hæmocytozoa have been found,

3 In this we were very kindly and ably assisted by Dr. Bartera

and zoologists have grouped them into three distinct

of the Italian Red Cross Ambulance.

""La Malaria e le Zanzare." Communicazione fatta al X°
Congresso della "Società Italiana di Medicina interna." Roma,

genera, called respectively: Hamamaba, Piroplasma,

and Hamogregarina.

The genus Hæmamæba is found in man, in bats, in monkeys, and in various kinds of birds during its asexual stage, and in no other class, unless we accept a still doubtful case in a tortoise (Trionyx indicus). It is fostered, as far as we know, by mosquitoes during its sexual stage.

The genus Piroplasma is peculiar to dogs, horses, sheep and oxen during its asexual stage; the species parasitic in oxen and dogs are transmitted by ticks from one intermediate host to another. Of the others we

have no knowledge.

The genus Hæmogregarina contains a large number of species and is possibly the oldest. It is essentially parasitic in amphibians and reptiles. We know nothing as to the way in which it is propagated.

Like man, so several animals harbour more than one species of hæmocytozoa. Thus, in the pigeon (Columba livia) we find both Hamamaba Danilewskyi and H. relicta; in the edible frog (Rana esculenta) we find Hæmogregarina ranarum, H. splendens, and H. magna; and in oxen we find two kinds of Piroplasma, if I am right in surmising that the small parasite is a distinct species, and not a mere form of the large

Piroplasma bigeminum.

The majority of hæmocytozoa, like those of man, are confined to one particular host, but some have two or more hosts. Dr. Low and myself found that Hæmamæba melaniphera, a parasite discovered by Dr. Dionisi in the mouse - coloured bat (Myotismyotis), is also found in Myotis capaccinii. Hamogregarina Lacazei is found in Lacerta agilis and in L. muralis. Hæmogregarina lacertarum is found in various kinds of lizards, and both Hæmamæba Danilewskyi and H. relicta are found in many birds of different genera.

Thus we see that the Hæmocytozoa conform to the general laws of parasitism, and that by examining their life-history comparatively with that of other better-known parasites, we may possibly succeed in

discovering their derivation.

The hæmocytozoa, like all other parasites, must have originated from non-parasitic forms, but the species now found in man and other vertebrates probably derived from earlier species already parasitic on other hosts. Modern research has shown that species split up into different varieties or species, according to the particular host they inhabit, and that they often become so greatly modified and changed, in order to adapt themselves to certain hosts and to certain conditions, that they become absolutely dependent upon these hosts, and the presence of these conditions for their existence. Such changes are actually taking place, and with certain organisms we can induce them experimentally. In fact, bacteria that have been fed for several generations on media rich in proteids refuse to grow on media rich in carbohydrates. The Stem Eel-worm (Tylenchus devastatrix) lives and reproduces in various cultivated plants, such as rye, oats, stored onions, hyacinths, buck-wheat, potatoes, and clover, and in wild plants,

*Hæmamæba Danilewskyi* is found in a large number of birds; in the course of evolution it will probably split up into as many varieties or species as there are hosts, just as Rust-fungi have split up into different varieties according to their particular host-plants.

When we find in the same host several parasites specifically distinct, but belonging to the same genus and living in exactly the same conditions, it is not unreasonable to surmise that, in the first instance, they probably derived from other hosts in which they acquired the peculiar morphological and biological characteristics which distinguish them now in the new host.

Clinically and pathologically, blackwater fever is a disease exactly similar to the hæmoglobinuric fever of cattle. Should the parasite of blackwater fever prove to be an exceedingly minute species of Piroplasma, we might surmise that the disease had been acquired in the first instance from that group of animals in which the genus *Piroplasma* thrives. This hypothesis concerning the etiology of blackwater fever is based on the following facts:

(1) That our inability to discover the specific parasites of certain diseases, is possibly on account of their diminutive size. In fact, some known parasites, such as the microbe of cattle peri-pneumonia, are so exceedingly small that we are unable to see them with our highest powers, unless they be aggregated

into masses.

(2) That while Piroplasma canis and P. bigeminum are comparatively large parasites, P. ovis is very minute. Indeed, when first discovered by Babes, it was described as a micrococcus and called Hæmatococcus.

The hæmocytozoa of man so far described belong to the genus Hæmamæba which is restricted to mammals and birds. Now, considering that, as a rule, we become infested with the parasites of those animals with which we come most frequently in contact, it would not be unreasonable to suppose that we may have derived the parasites of our intermittent fevers from those animals, like certain birds and bats, which nest in cities under our very roofs, and that the parasites have been transmitted from these animals to man by those mosquitoes which have also linked themselves with man after the fashion of the cockroach and the house-fly. However, all attempts to infect various species of animals with the hæmocytozoa of man by injecting blood containing these parasites have been uniformly unsuccessful. The few experiments made by means of infected mosquitoes have likewise proved negative. But experiments of the kind have been as yet too scanty to allow of any definite statement. Prof. Dionisi<sup>2</sup> inoculated four men with the blood of bats containing their peculiar hæmocytozoa, and his experiments were inconclusive.3

such as Poa annua, Anthoxanthum odoratum, Dipsacus silvestris, and Polygonum persicaria, but not to the same extent in all. However, Eel-worms, of which the progenitors have developed for many years exclusively in rye and buck-wheat, are not easily transferred to another kind of plant, or at any rate, they do not multiply vigorously there.

Report on Two Experiments on the Mosquito-Malaria Theory. Medico Chirurgical Transactions, vol. lxxxiv. London,

<sup>&</sup>lt;sup>2</sup> "La malaria di alcune specie di Pipistrelli." Annali d'Igiene

sperimentale. Roma, 1891.

3 One man inoculated with blood of the mouse-coloured bat (Myotis-Myotis), containing a hæmamæba somewhat similar to

But the mosquitoes which propagate the parasites of the intermittent fevers do not feed exclusively on the blood of vertebrates, and it would be rash, therefore, to venture any opinion as to the derivation of the hæmocytozoa of man until we have a definite knowledge of the feeding range of the Anophelina. The general opinion is that mosquitoes in the perfect state are essentially phytophagous. Several entomologists have seen them settled on plants sucking the juices of flowers, and Lieut.-Col. Giles, who examined the contents of the stomach of mosquitoes in India, states that "the most usual recognisable constituent in both sexes was pollen." In captivity they will readily imbibe the juices of fruit.

Mr. L. O. Howard <sup>2</sup> says: "The female mosquitoes are normally without much doubt plant-feeders. Why they should draw blood at all is a question which has not been solved. It has been surmised that a supply of highly nutritive fluid is necessary for the formation of the eggs, but this supposition is at once emphatically negatived by the fact that mosquitoes abound in regions into which warm-blooded animals never penetrate. The statement which the writer has elsewhere made, that not one in a million ever gets the opportunity to

taste the blood of a warm-blooded animal, is unquestionably an under-estimate. There are in this country enormous tracts of marshy land into which warm-blooded animals never find their way and in which mosquitoes are breeding in countless numbers, and when we get within the Arctic Circle and other uninhabited regions the point is emphasised." species of mosquitoes may be strictly phytophagous, but the Anophelina are decidedly carnivorous. The fact that female mosquitoes can be kept alive for months on the juices of fruit does not prove that the sap of plants is their natural food. On the contrary, however paradoxical the proposition may seem, it proves that their life has been prolonged by the want of suitable food. Indeed, it is a well-known fact that the female mosquito dies after having exhausted her ovaries by successive ovulations, but that it may live for months, exhibiting that remarkable endurance to want of food which is common to

parts, like those of the males of other Diptera (Simuthe tertian parasite, had a paroxysm of fever after twenty-eight

many insects, so long as unfavourable conditions prevent oviposition. Mosquitoes are exceedingly

voracious during their larval stage, because that is

a period of rapid growth and demands a large amount

of food. But the insect in the perfect state is, as a rule, short-lived, does not grow, and requires very little food, all it needs is a certain amount of water, especially

in very dry weather, and this it imbibes from plants.

The male anopheles can only sip water, his mouth-

Another man inoculated with the blood of *Miniopterus schreibersii* containing a parasite resembling that of quartan fever suffered after fifteen days from two paroxysms of fever of tertian

Of two men inoculated with the blood of the noctule Vesperugo noctula) containing an unpigmented parasite, one, after twelve days, suffered from fever of a sub-tertian type, the other remained immune. In none of these cases were parasites ever found although the blood was examined in each case for over a month.

"A Handbook of the Gnats or Mosquitoes." London, 1902.

lidæ, Tabanidæ), are inefficiently developed for any other purpose. But the female mosquito needs a certain amount of food-reserve for her ova, and this requirement is well exemplified in Ripicephalus annulatus and other ticks, the females of which, after fertilisation, suddenly gorge themselves enormously with the blood of the host on which they have lived parsimoniously throughout the various stages of growth and metamorphosis.

Mr. Howard's statement that not one in a million mosquitoes ever gets the opportunity of biting warmblooded animals within the Arctic Circle is, I think, not under-estimated, but greatly exaggerated. Certainly the Mammoth and the Bison roam no longer over the vast Tundras, but in their short, hot summer, these regions become richly populated with Arctic

mammals and migratory birds.

But the blood of mammals and birds is probably not essential; that of amphibians, of fish and of insects may serve the same purpose, and, in fact, Mr. J. Turner Brakeley<sup>8</sup> saw a fresh-water tortoise surrounded by mosquitoes; Mr. C. H. Murray saw the mosquitoes alight upon the heads of young trout as the latter came to the surface of the water; Dr. H. A. Hagen caught a mosquito which was feeding upon the chrysalis of a butterfly; Mr. Theobald 4 saw Culex migritulus sucking the body of Chironomus and other small diptera; and Dr. H. A. Veazie saw mosquitoes stinging the Cicada and its pupa.

The fact that mosquitoes suck the blood of other insects is very important, because it shows that we may have to search a wider field for the derivation of our hæmocytozoa. The sporozoa are widely distributed amongst the arthropoda: I need only mention the silkworm parasite (Glugea bombycis), which has

cost communities millions of pounds.

It is not unreasonable to suppose that vertebrates and invertebrates may both foster the asexual stage of the hæmocytozoa. We have many examples to prove that both the intermediary and the definitive host of parasites may be represented by animals belonging to widelysundered groups of the animal kingdom, while closelyrelated species are not susceptible. Should invertebrates be capable of fostering the asexual stage of the hæmocytozoa which are known to live in the blood of vertebrates, we might be able to explain many obscure points in the geographical distribution and epidemiology of the intermittent fevers. Already in another paper on the "Principles Determining the Geographical Distribution of Disease," I suggested that the disappearance of the intermittent fevers from England and other places, notwithstanding the abundance of suitable mosquitoes and other favourable conditions, might be possibly connected with the extinction of some animal, or perhaps some plant, which may have been a necessary link in the chain of their natural history, and I mentioned the Large Copper Butterfly as an example of a species which has lately become extinct within the ague districts of England.6

<sup>&</sup>lt;sup>2</sup> "Notes on the Mosquitoes of the United States." Bull. xxv., New Series, U.S. Dept. Agriculture, Washington, 1899.

<sup>&</sup>lt;sup>3</sup> Howard, loc. cit.
<sup>4</sup> "Monograph of the Culicidæ or Mosquitoes." London,
1901.

<sup>&</sup>lt;sup>5</sup> JOURNAL OF TROPICAL MEDICINE, April 1st, 1902. <sup>6</sup> Mr. Theobald believes that the disappearance of ague from England may have been due to the fact that Anopheles maculipennis has lost the habit of blood-sucking in this country. He

From what I have said, it is obvious that our information is as yet too scanty to allow of any serious conjecture as to the derivation of the parasites of the intermittent fevers.

#### PROPHYLAXIS.

With regard to prophylaxis, I wish to say a few words on a method of prevention which I think has not yet received adequate consideration. I mean the study of the natural enemies of the malaria-bearing mosquitoes. In the domain of agriculture we have already achieved wonderous success by pitting against certain injurious insect-pests their natural enemies and parasites. A good example is that of a fungus Tsaria destructor, which Prof. Metzchinoff employed to destroy the larva of the Beet-chafer (Anisoplia agricola), which caused much damage to the beet-fields in Russia. The use of the fungus, combined with a suitable rotation of crops, answered most admirably, and, indeed, after a few years the beet crop became so great that it was thought advisable to let the beetle continue its ravages and thus become once more the regulator of the produce! Surely, it is reasonable to expect similar results in combating those insects which foster and disseminate the pathogenic parasites of man. Already a number of predaceous and parasitic enemies of the Anophelina have been described, some of them exceedingly injurious to the genus and attacking it either in the larval stage, or in the adult stage, or again in both; but the information so far collected is still very scanty and no experiments have been made to test its practical value. In connection with this, I wish to draw attention to the fact that very frequently the intentional or accidental introduction of certain species has caused the disappearance of allied native species, not because the introduced species preyed upon the native one, but on account of that intense rivalry which takes place universally amongst closely-related species which use the same food, the same hosts, and the same breeding grounds; or, sometimes, on account of parasites tolerated by the introduced species, to which they have become inoffensive, but deadly to the native ones. Thus the advance of the Colorado beetle (Leptinotarsa decem-lineata), and its prodigious increase on the cultivated potato, has caused the disappearance of the native species (Leptinotarsa juncta) from Illinois, Delaware, Maryland, and New Jersey, where it was formerly very abundant. Again, Pieris rapa has replaced, in America, the native Pontia oleracea. Walsh pointed out, thirty years ago, that the westward spread of the European Mytilaspis pomorum caused the gradual local disappearance of the native Chionaspis furfur. Hubbard has shown that the increase of the imported Mytilaspis citricola in Florida was followed by the decrease of Mytilaspsi gloverii, which, though not native, was an earlier importation. A well-known example is that of the Brown rat (Mus decumanus) from East Central Asia, which has practically expelled the Black rat (Mus rattus) from Europe, just as the latter has been ejecting weaker

rodents from South America. Many other instances might be adduced, and in some cases the biological effects of the introduction of an alien species are very considerable. The introduction of goats into St. Helena caused the destruction of a whole flora of forest trees, and with it the extermination of all the insects, mollusks, and perhaps birds dependent upon it.

The chief preventive measure against malaria is, undoubtedly, the drainage and cultivation of the swamps and meres which are the breeding grounds of the malaria-bearing mosquitoes; and such measures have always proved efficient whenever they have been thoroughly put into act and fact, from the oldest times when Empedocles reclaimed the fever swamps of Agrigentum. But when, owing to economical or other reasons, the obliteration of the swamp is not possible, we must necessarily have recourse to other means. The kerosene treatment of the anopheles' breeding-grounds is practically impossible over wide areas of uncultivated land. The weeding of small water-courses by men or cattle, as practised in the Pontine Marshes, is of little importance. The routine administration of quinine to the malaria-bearing native population in order to avoid the infection of new broods of mosquitoes is, in most regions, beyond possibility. But a combination of these methods, and the general use of mosquito netting are bound to yield good results. I have no doubt, however, that sooner or later we shall find some plant that will prevent the breeding of mosquitoes, or some innocuous gnat which will displace the dangerous anopheles, or some other animal which will prey upon it and prove as successful as the ladybird (Vedalia cardinalis) with which Dr. Riley saved the great orange industry of California that was being destroyed by a scale insect, the Icerya purchasi. Already we know that the common duckweed (Lemna) will prevent the breeding of anopheles in small quiet pools by completely covering the surface of the water, and we know that whenever several species of mosquito larvæ are found together in the same body of water, one of them is usually greatly preponderant, the others being apparently ousted by the most successful. Indeed, the larvæ of Corethra and Psoro-We know phora prey on other larvæ of Culicidæ. also that the larvæ and pupæ of mosquitoes are devoured in great numbers by water-fowl, small fish, or by the predacious larvæ of many aquatic insects (Dytiscidæ, Hydrophilidæ, Gyrinidæ, Notonectide, Odonata), and that they are often destroyed by parasitic alge. Likewise, the swarming adult insects may be killed off by bats, nighthawks, swallows, martins, flycatchers, lizards, and dragon flies, or they may be attacked by ecto-parasitic acari, such as Acarus culicis, or by internal animal parasites, such as Filaria, Trematodes and Sporozoa; or, again, by certain fungi, such as Entomophthora culicis, which at times causes veritable epidemics amongst them.

I am fully aware that certain experiments with natural enemies have utterly failed, but probably, in such cases, the life-history of the organism employed was imperfectly known, and consequently some necessary intermediate host, some associate-organism, or some special condition of environment was neglected.

says: "I have never known this species to attack human beings, and yet I have lived in districts where it often occurs in great numbers and other mosquitoes are troublesome."

We cannot always unravel the tangled skein of interrelationships which make up the peculiar ecology of

each organism.

In a few instances, the intentional introduction or cultivation of natural enemies have proved positively disastrous. Thus the sparrow introduced into the United States to destroy canker-worms has become a veritable pest throughout all the Austral and Transition regions of North America, while the place of the injurious insect it was imported to destroy has been taken by another and worse insect pest which it will not touch. Another instance in point is that of the common mongoose of India (Herpestes mungo), which was introduced into Jamaica, in 1872, for the purpose of ridding cane-fields of rats. The rats were soon annihilated, but the evil results of the introduction of the mongoose far outweighed the benefits rendered to the sugar plantations.

Should we fail to destroy mosquitoes by means of their natural enemies, there would still be the hope of finding some hyper-parasite that might prevent the development of the parasites of intermittent fever within the body of mosquitoes. Indeed, the disappearance of the hæmocytozoal fevers in places in which the suitable mosquitoes abound may possibly have been brought about by the agency of hyperparasites. The "Blackspores" or "Brown bodies" discovered by Major Ross and believed at first to represent a special stage in the life-history of the hæmo-

cytozoa are probably hyper-parasites.

A well-known instance of hyper-parasitism is that of Ichneumon flies. The parasitic larvæ of these flies exercise a constant check upon the increase of aphides and other insects injurious to plants, but they are likewise themselves kept within due bounds by hyper-parasites, which detect at once a "stung" aphide or caterpillar, and deposit their eggs within the body of the internal parasite. The larvæ hatched out of these eggs may also be attacked by similar foes, whose offspring in turn may suffer in like manner. It is a wonderful process carried on indefinitely, far beyond our powers of investigation, and of which those "nested" Japanese boxes, which are enclosed one within another, are an apt illustration.

#### THE AFTER-COMPLICATIONS IN THE OPERATIVE TREATMENT OF CATARACT.

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In the following paper it is proposed to take up in turn some of the complications which one meets with in the treatment of cataract after operation.

These suggestions must be read in connection with my previous paper, which appeared in the JOURNAL OF TROPICAL MEDICINE for September 1st, p. 263.

While writing, I have under review (1) about 1,200 cases which, in my early days, I operated on as far as possible by the Simple Operation and by the ordinary methods; and (2) another 800 cases in which the Combined Operation was always performed if possible, and in which MacKeown's valuable method of irrigation of the anterior chamber was used as the routine procedure.

Each heading may now be taken up in turn.

(1) Want of sound union of the section may almost always be set down to some defect in the nutrition of the patient. Most of the patients are advanced in years (i.e., above the average age of those operated on). In one series of 77 cases, the section leaked in 7, or in 909 per cent. At one time in this series, several ununited sections occurred together; this led me to investigate the cause, and I found that the cookcontractor was robbing the patients' food. Attention to this point led to an immediate healing of all the sections.

In two other series, comprising 750 cases, delay in union was met with in 66, or in 8.8 per cent. limits of delay were from two to sixteen days, most of the cases healing on the fifth or sixth day; this was probably due to the routine commencement of treatment on the fourth or fifth day. If the section has not united by the fourth day, two drops of solution of arg. nit. (gr. 3 ad. oz. 1) are instilled on to the section every morning; the bandage is continued over both eyes till the chamber has been closed for at least two

days.

I have been accustomed to think very lightly of this complication, as my own experience had closely coincided with that of others, as to its seldom leading to trouble. Recently, however, I lost an eye from suppuration setting in on the fourth day of an open section; there had been slight conjunctival congestion before operation. This misfortune has invested "leaking section" with an increased importance in my eyes, especially if there has been any doubt about the state of the conjunctiva beforehand.

When there is reason to doubt the patient's powers of repair, it is well to take up a small conjunctival flap with one's section. If the section advocated in my previous paper be used, this can always be easily done, even although, as there pointed out, the wound lies almost entirely in the corneal tissue, for situate as it is in the limbus, it only encroaches on the sclerotic in its external scleral process, and yet it gives us ready

access to the conjunctival margin.

(2) Injury to the eye during healing.—This is generally due to the patient finding the eye itchy and rubbing it. It practically always takes one of two forms, either the section is burst, or the chamber fills with

blood.

In 827 cases I find that the patient burst his section eighteen times, or in 2.17 per cent. This accident usually occurs within the first week, but may rarely be met with later. It is commonly unattended with symptoms, but in two cases it was accompanied by severe pain and obstinate vomiting. Some hæmorrhage into the chamber not uncommonly attends rupture of the section, and a subsequent capsulotomy is therefore sometimes called for. I can find no case in my notes in which this accident led to loss of vision, nor can I even find that it markedly unfavourably influenced the results of the operations.

In the same 827 cases, hyphæma was found in 35, or in 4.24 per cent. In one case it was due to a fit of coughing, in another to a blow (the eye striking the bed-post), and in most of the rest to the patient rubbing the eyeball. This accident may occur as early as the fifth day, but is more often met with later. Speaking generally, an injury to the eye during the first week will burst the section (with or without some hæmorrhage); whereas an injury at a later date leads to hyphæma, the section being by then fairly strongly healed.

Here, again, I cannot find that any eye has been lost, or that vision has been sensibly lowered by the accident; but it is my impression, that if one were able to follow these cases for some months, many of them would benefit by a capsulotomy. As a rule, it takes several days for the absorption of blood from a chamber, if the hæmorrhage has been free; I have, however, seen one case in which a chamber full of blood cleared completely in twenty-four hours.

Bleeding into the anterior chamber, which occurs after the chamber has once cleared of blood after operation, may almost certainly be attributed to an injury, and usually in the East to the patient having

rubbed the eye.

Hæmorrhage occurring at the time of operation may come from the iris or from the conjunctiva. I have never seen reason to think it may come, as has been stated, from the sclerotic. With MacKeown's irrigator, the blood can be easily and safely washed away; and in the last 750 cases I have operated on, I cannot remember, or find notes of, one in which the chamber was blood-stained the morning after operation. Need one point out that this lessens the strain put upon the absorptive powers of the eye, and so makes for

safety?

(3) Faulty apposition of the flap is discovered at the first dressing. It is more likely to occur in troublesome patients, who will not allow the toilette of the wound to be carefully attended to, and especially in those whose vitreous has escaped or threatened. immediate agent in producing the complication is the edge of the upper lid, which catches in the free edge of the flap, and either pushes it downwards, or even turns it back on itself. Want of elasticity of the cornea pre-disposes the eye to this accident. When one sees that the section-flap is inclined to turn backwards or to slip down, the lid should be lifted off the globe either with a finger and thumb, or, if necessary, with a pair of forceps, and held thus while the flap is reposed in position, the patient being directed to look downward for the purpose; he should then be told to look up-By the latter movement he carries the section well under cover of the lid, which can be gently lowered on to it, and the eye is at once closed and bandaged.

If, in spite of care, the flap has set in bad position, it is better to instil a drop of cocaine, and repose it

with a spatula at the first dressing.

In 827 cases I find that the section was in faulty apposition in 9, or in 1.08 per cent.; it was satisfactorily replaced under cocaine in 6, all obtaining good vision; of the remaining 3, one obtained very indifferent sight, the other two recovering with good vision. It is obvious, however, that the defective apposition must have led to increased astigmatism.

(4) Cystoid cicatrix is an uncommon condition in my experience, presumably because the irrigator effectually washes any capsule tags into the chamber, and therefore out of the section. In 827 cases I met with it once, and as pressure and bandaging failed to relieve

the condition, I freely excised the bulging section, with the result that sound union was at once obtained.

One may meet with a bulging section in a condition apart from that just described; here it is not a portion of the section that yields, but its whole extent, and further it is not the section itself which is to blame, but the tension of the eye, which is raised by some post-operative condition. In the only case of this nature I have met with in over 2,000 operations, the tension was normal before operation, the chamber was of normal depth, the cataract cortico-nuclear, with thickening of the capsule. The patient, a male, aged sixty years, had been treated before operation for slight catarrh of the conjunctiva; his eye had been useless for two years, and he could only detect hand movements with it. The lens was removed by the combined operation, and a large amount of doughy cortex was washed out with MacKeown's irrigator; a piece of thickened capsule was removed with iris The section healed, and the eye looked well on the third day; on the fifth day the section began to bulge, and the bulging, which was apparently due to over-distention of the vitreous, increased in spite of firmly-applied pressure; on the fifteenth day the conjunctival membrane, which apparently formed the whole covering of the section, was carefully snipped away under cocaine, and the projecting vitreous was snipped off with scissors; the section then healed, and on the twenty-sixth day the patient presented a firm, quiet eye. It seems probable that in this case there was some obstacle to the outflow of fluids from the vitreous leading to an elevation of the tension of the globe. The patient recovered with excellent vision. Possibly this is a case of very early post-operative glaucoma.

(5) Striped keratitis is as common as it is unimportant. Whether it is due to wrinkling of the posterior corneal layers, or to damage to the posterior lining membrane and endothelium, one thing at least is certain, viz., that the delivery of a large, hard lens under any circumstances, or the delivery of any lens through an insufficient section, is likely to be followed by striped keratitis. It is seldom that this transient condition calls for any treatment, but if the resolution of the opacity is delayed, it is well to apply a yellow oxide ointment to the conjunctival sac. It is important to distinguish a quite different class of cases, viz., those

in which true keratitis occurs.

(6) Such a misfortune is to be apprehended after operation on a cornea which has at some previous time been ulcerated, and it is essential to examine the cornea beforehand in every case, and to abstain from operation if the mischief be still active. Even when the eye is quiet at the time of inspection, I would counsel delay for several months if the trouble has been recent. Some years ago I met with a very distressing case in which troublesome ulceration of the cornea followed a too free use of cocaine, and this has led me to be very sparing of cocaine in any case in which there seems reason to doubt the absolute healthiness of the cornea.

(7) A certain amount of catarrh of the conjunctiva is not uncommon after extraction. When it calls for treatment, this should be mild, and on ordinary lines.

The same remarks apply to congestion of a pterygium complicating the after-course of our cases. Such an

accident will be rare if the pterygium is avoided by the knife in section.

(8) Spasmodic entropion is an uncommon complication met with in old people. It occurred 5 times in 827 cases, or in 0.60 per cent. It is readily remedied by releasing the eye, and if this be promptly done, no serious consequences follow; any delay in so doing will lead to corneal complications of a very serious character. Of the 5 cases, 4 obtained good and 1 poor vision.

(9) The question of Iris-prolapse has been already dealt with under that of the advantages of the combined operation in my previous paper. If iridectomy be performed, and the iris edges be well replaced by the aid of MacKeown's irrigator, it will be but seldom that symptoms will arise demanding the reopening of the section and the removal of the impacted portions. In 250 cases, I had to resort to this measure only twice, or in 0.8 per cent. In 4 other cases tags of iris were impacted, but they were very small and did not give

rise to any marked symptoms.

When signs of ciliary congestion or of iritis are present in consequence of this complication I hold strongly that it is mere tinkering to "abscise" the prolapsed iris; the section should be freely reopened along the whole extent of the prolapse, and the latter should be liberated from the abnormal attachments, and freely excised, the iris edges being then carefully replaced in the chamber. The operation is a difficult one and requires dexterity, but when well done it gives the patient his best chance of good and permanent vision. It is essential to perform it as soon after the occurrence of prolapse as possible for two reasons: (1) that the iris is not given time to form dense adhesions, and can therefore be readily detached; and (2) that cocaine acts much better on uninflamed structures than on those which have been for some time inflamed. Chloroform is objectionable, as the efforts to pull the eye down with the forceps menace the integrity of the vitreous.

I find that, in 827 cases of extraction, the above operation was performed 10 times for prolapse after 69 simple operations, with good results as to vision in all; it was performed 14 times for prolapse of the iris edges after 758 combined operations, with 13 good results and 1 poor one. The larger percentage of prolapse amongst the combined cases is largely due to the fact that, except in a first series of 77, the simple operation was only performed when an iridectomy could not be performed on account of the patient being refractory, and consequently the risk of prolapse was

then greater.

(10) Septic post-operative conditions are amongst the gravest we have to do with. As soon as signs of acute iritis, iridocyclitis, or keratitis show themselves, I order the patient the time-honoured blue pill and black draught in a dose proportioned to his strength, four leeches are applied to his forehead and temple, and their effect is exaggerated by subsequent fomentations three or four times daily for the next few days; the conjunctival sac is kept immersed in warm chinosol solution (1/3,000) for ten minutes at a time immediately after each fomentation; the method employed is the excellent one recommended by Professor MacKeown; with the patient on his back, the head on a low pillow,

the chin well raised, and the face turned away from the side of the affected eye, one takes advantage of the cup formed by the nose on the inner side and the projecting margins of the orbit above and below to create a natural basin of antiseptic fluid in which the open eye can freely soak.

Atropine and cocaine are freely exhibited, every care being taken to avoid atropism by closing the lachrymal canaliculi with finger pressure for a minute after each

instillation.

When the acute symptoms are disappearing under this treatment, blisters are applied to the temple if there is any undue delay in convalescence, and at a later stage still I do not hesitate to place a seton in the temple. I am satisfied that both blisters and setons at this stage are powerful and valuable aids in the treatment, notwithstanding the decided opinions one reads of to the contrary.

From the commencement the patient is put on bark and ammonia, and a light nutritious diet is given, with the addition of stimulants. The improvement in a number of the cases after the exhibition of stimulants has sufficed to prove their value to me, especially in the

later stages of the inflammation.

The above method of treatment has given me most satisfactory results on very many occasions when the eye seemed at first to be very gravely threatened. As an instance one may cite the case of a high-caste and very wealthy native patient who refused to have any bandage on that was not made of silk (for caste reasons); the silk creased, folded and slipped off, and then I have no doubt he rubbed his eyes; at my next visit he was suffering from an extremely acute iritis, and the case looked almost hopeless; under treatment he made such a good recovery that he could without difficulty read the smallest newspaper print, and he was thus able to resume an active part in his very extensive business as a native banker.

On the other hand, there are many cases which steadily go to the bad in spite of any treatment. I have tried reopening the section and freely irrigating the chamber with chinosol solution, and again with sterile normal saline solution; the antiseptic seemed to modify and check the intensity of the inflammation in the case it was tried in, but that is the most one can claim for it. My own belief is that inflammations of a septic type which show themselves within twenty-four hours of operation are in more than 50 per cent of the cases hopeless from the first, be the treatment what it may. The later the inflammation appears, the less cause is there to fear for the safety of the eye, and the more cause to look for some factor in the state of the patient's general health.

Among the septic complications in my notes of 750 cases, there were 3 cases of panophthalmitis. It is my custom to enucleate as soon as I am satisfied that suppuration of the globe has definitely declared itself. Amongst my first 1,100 cases I have notes of one in which for a reason I have since forgotten I delayed enucleation for several days. Finally, the ball was removed; the same night hyperpyrexia came on, and the patient died within sixteen hours of operation. I unfortunately did not see him, and a post-mortem was refused. My treatment in enucleating the eye was adversely criticised, but I blame myself not for operat-

ing, but for delaying the operation. Others may consider that I should have eviscerated. In the 1,100 cases amongst which this occurred, panophthalmitis

had appeared 11 times.

(11) Secondary Glaucoma appeared in 3 cases out of my first 1,200. With the doubtful exception of one case already commented on in this paper, I have not met this complication in my last 800 cases, and I attribute this immunity to the thorough way in which MacKeown's irrigator enables one to complete the toilette of the eye, and thus to guard against the impaction of loose ends of capsule in the section.

It is likewise to the irrigator that I have to ascribe my freedom from bubbles of air left in the eye after operation, a complication that figured twice in my first

1,200 cases, but never since.

(12) The question of the best method of dealing with cases of Secondary Cataract requires for its solution a clear preliminary understanding of what we mean by the term in question. It would not be wide of the mark to state that the expression is so loosely used as to include any obstacle to clear vision after operation which has its seat between the plane of the iris and that of the anterior of the boundary layer of the vitreous, both the structures named being included.

We can classify these secondary membranes on a basis which is at once morphological and surgical.

Thus we meet with the following:

(1) Thickenings of one layer of the capsule, practically always the anterior, which existed before the extraction. These should, and easily can, be dealt with at the operation, either by removing a large central portion of the capsule with capsule-forceps before delivering the lens, or by inserting a pair of iris-forceps after the lens has escaped, and so extracting the membrane. latter is my own practice, but it is a manœuvre which I would not recommend to any surgeon who is not confident of his powers of operating, as a false move on the operator's part, or a sudden movement of the patient's, will gravely menace the vitreous. A quick, light touch is essential for safety, but when the manœuvre is successfully carried out the result is all that can be desired. I find that in 750 consecutive operations portions of capsules were removed in this way 36 times, or in 4.8 per cent. In 5 the vitreous either threatened or actually escaped in small quantity, in 5 the healing of the section was delayed for some days, and 1 suffered from a severe attack of keratitis. 33 cases the visual result was good, and in 3 it was

It is by no means easy to always diagnose slight but important thickenings of the anterior capsule before the escape of an opaque lens. When this diagnosis can be made, it will be well to use capsuleforceps, and so ensure the removal of the opacity before

the lens escapes.

(2) The inclusion of cortical matter or of unabsorbed blood between the two layers of the capsule. This condition is probably due to the adhesion of the edges of the capsule wound to the posterior layer, a condition which results in the shutting off of the contents of the capsule from the aqueous fluid, and so effectually stops absorption. A proliferation of the cells lining the capsule is, in many cases, doubtless, an added factor.

MacKeown's method of washing out the capsule greatly diminishes the risk of occurrence of this kind of opacity, as it clears the capsule of blood and of lens  $d\hat{e}bris$  in a most effectual manner. In cases of post-operative hyphæma a secondary opacity of this nature is very liable to form.

(3) Crinkling of the posterior capsule. This comes on gradually some little time (weeks, or even months) after operation, and sometimes most unfairly discredits the original operator in the eyes of the patient. It is not impossible that the anterior limiting layer of the vitreous sometimes takes a part in this change.

(4) Eccentric position of the aperture in the capsule is quoted by some authorities as a cause of secondary cataract. It is a condition of which I cannot speak

from experience.

For the conditions described under headings 2 and 3 (and I have no doubt 4 may be included), there is no method to beat discission with two needles. It has been my good fortune never to have met with an accident after this operation, and in the course of the after-treatment of 2,000 and more cases I have performed it frequently. Possibly this satisfactory result is largely to be ascribed to the fact that it has been my custom to look upon this little operation as one calling invariably for the same strict observance of antiseptic treatment as an operation for primary cataract. There is a considerable difference of opinion amongst surgeons as to the best period of the case for this procedure: some have advocated a very early interference on the ground that the capsule is then more easily torn, whilst others have laid stress on the advisability of a long delay before submitting the eye to a second operation.

There is no doubt in my mind that to submit the eye to a second operation till it is in a thoroughly quiet state after the first is unjustifiable. With this reservation I would name one month after the first operation as the most suitable time for the second; earlier than this is unsafe, as the section may yield, or other complications may ensue. To wait longer is unnecessary in most cases, and possibly inexpedient as

rendering the membrane harder to tear.

(5) Exudation-products blocking the pupil. These are the results of post-operative iritis, and vary greatly in density. Discission is unsuitable for such cases, as the opening formed quickly closes again. I have tried Knapp's knife-needle for this form of secondary membrane, and found it most unsatisfactory, but must admit that the instrument supplied me was not of the best make. Iridotomy performed with Brudenel-Carter's intraocular scissors gives excellent results, with the proviso, however, that iritis always menaces the prognosis of a case.

Mr. Walter Jessop has recently shown me the ground-down cataract knives he uses for discission of such membranes. They are well worthy of a trial.

(6) Dragging of the iris up into the section has been sometimes included under secondary cataract. This condition is due either to severe iridocyclitis following operation or to a free escape of vitreous during the operation. In either case the prognosis is most unsatisfactory, and iridotomy is the best method of interference at our disposal. It is well not to expect too much from it.

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#### THE

## Journal of Tropical Medicine

SEPTEMBER 15, 1902.

### THE OLD AND NEW ARMY MEDICAL SCHOOLS.

THE transference of the Army Medial School from Netley to London marks a distinct epoch in the teaching of military medicine. Some condemn the step taken, and some enthusiastically approve of the decision to bring the young medical officers to the metropolis. The change is no doubt the outcome of recent events in South Africa; it is really the result of the attempt made by ignorant persons to defame the medical officers of the Army engaged in the Boer war. If by their accusations and unjust criticisms, however, these hysterical persons have done good, the medical profession will be content to forgive them. The question is, what good has been done by pandering to the clamours of these would-be benefactors? We are not prepared to shut our ears to the arguments advanced by Sir Joseph Fayrer in his speech at the last prize distribution

at Netley. Sir Joseph pleaded the cause of the retention of Netley as the Military Medical School in terms which are difficult to refute, and many men agree with him.

It is not the first time the Netley school has been on the verge of being closed; once, if not twice, it was only by the direct intervention of Queen Victoria that the Government laid aside their intention of iconoclastic dealings with Netley; but at that time no substitute for the School was contemplated. The short-sighted Government of the time thought to save money by closing the School and stopping the special training of Army medical officers entirely. The Army medical officers of to-day have to thank Sir Joseph Fayrer for such a national calamity being averted; for the cessation of special training for the Army medical officers is not one whit less absurd than it would be to turn lads accustomed to fire toy cannons at school to handle big guns without being trained. The institution fostered so carefully by Queen Victoria is, however, closed, and we must be prepared to help forward in every way possible the school under its new auspices.

The chief argument advanced for the new school is that it brings the cadets of the Army Medical Service in touch with the medical schools of the metropolis, and therefore in line with modern teaching. The young men, however, who join the Army Medical Service have only just left these schools; they are acquainted with the most modern surgical and medical experiences of our universities, schools and hospitals; they have but a few months previously served as either surgical dressers, clinical clerks, house surgeons or house physicians. It is not, therefore, a matter of urgency that they be in "touch" with the schools where they have studied and which they have just left. What they want is instruction in military medicine and surgery, military hygiene, hospital administration, and ambulance work. These are the subjects that specially distinguish the military officer from the civilian practitioner, and it is a question where these subjects can be best acquired. To our way of thinking, the magnificent clinical opportunities at Netley Hospital, the military regime there in vogue, and the

opportunity of acquiring a knowledge of hospital adminstration could be better acquired at Netley Hospital than in any other institution in Great Britain. Could Netley Hospital be brought to London with the School then there would be no need for discussion of the subject; for at Netley the medical officers have opportunities of becoming acquainted with tropical disease to an extent impossible in London.

However, the transference to London is an accomplished fact, and it behoves the civil medical profession to welcome their confreres. We are of opinion that the discipline followed at the Medical Staff College will have a beneficial influence in the metropolitan schools; and we would urge upon the civil schools the advantage of properly conducted residential quarters for their students. A model will be afforded by the Army Medical Staff College, and we have no doubt the authorities of the metropolitan medical schools will be willing and anxious to learn the methods of dealing with young medical men engaged in studying their profession. Army Medical School, being in London, will also bring amongst us the able and distinguished men who are engaged as professors and instructors in the School. Their presence in London will strengthen the importance of our scientific meetings, and they will bring a wealth of experience to bear on many subjects which belong especially to their province. Their presence in London will also serve to keep the military and civil branches of our profession in more intimate touch, and will help to lessen the gulf which up to the present time has rather tended to widen than to close. We think, therefore, that whatever our opinions may be as to the expediency of moving the School, that professional, and thereby national, good will ensue; and we beg to welcome our military brethren to the metropolis, where we are sure the benefits to both the civil and military branches of medicine will be mutual.

## The British Guiana Medical Annual for 1902.

ANKYLOSTOMIASIS: THE CATARRHAL CONDITION OF THE INTESTINAL TRACT.

By C. P. KENNARD, M.D.Edin., M.R.C.S.Eng.

In a paper in B. G. M. A. for 1899, I expressed the opinion that the great trouble in ankylostomiasis was the catarrhal condition and wasting of the intestinal tract and that the resulting indigestion was the chief cause of the anæmia in the chronic cases. I record this case as illustrating that; and it is also of interest as from the general appearance it has been diagnosed recently as chronic malarial cachexia, although it is very similar to the general run of cases so called, yet the malarial parasite has not been found in the blood during the year I had her under my observation, and the fever, when present, did not show a malarial periodicity.

Dulari, female, aged 30, E. I., ex Lena, 1900. October 5th, 1900, on arrival on the estate she was apparently well nourished, looking rather older than stated, nothing special about organs, stool contained

ankylostome ova.

Between this and May she was in two or three times for slight ailments and was treated for the ankylostomes, being given calomel, grs. v., followed by ol. ricini and the day after three-hourly doses of thymol, grs. xxx., and ol. ricini afterwards if required.

May 7, 1901. — Admitted to hospital complaining of fever. Does not look strong, is rather anæmic. Spleen apparently not enlarged. Nothing special about her; for the next eleven days she had a daily irregular temperature varying between 102° and 99°, reaching normal on four days for a short interval; the skin was moist, there was no free perspiration; the blood examined on four separate occasions, no malarial parasite or pigment found, but some little red pigment, leucocytes about normal, in a very few unaltered R.B.C. were moving very small clear bodies, rod or pear shape, these bodies move en masse and do not show any protrusion of parts as the malarial parasite, they do not contain pigment; there were some dyspeptic symptoms, tendency to looseness of the bowels and pain in the stomach, but otherwise there was nothing definite about her.

May 20. - Says she is now all right, is rather anæmic. Spleen is enlarged, posteriorly just below

the edges of the ribs. Discharged.

May 25.—Returns to hospital saying she has been getting fever since she has been out; is anæmic, looks worn, nothing definite about her; temperature 101°, dropping to normal the same day and rising to 99° the

Blood shows some increase of leucocytes; no malarial parasite or pigment. Given calomel and thymol.

May 29. - Looks better; tongue not so pale. Discharged.

June 3. - Returns, complaining of feeling weak and some pain in stomach; is anæmic.

June 4.—Stool examined, no ova found.

June 11. - An A. D. ovum found in stool; given thymol treatment.

June 17.—Tongue less pale; some abdominal pain. June 21.—Is not improving; anæmic; complains of swinging in the head; spleen can now be felt nearly a handbreadth below ribs forward; is rather soft; no tenderness; complains of pain there sometimes; is not getting distinct fever but has frequent rises of temperature to 100°; no purging; has frequent pains in the stomach and umbilical region; abdominal walls lax and emaciated, on deep pressure, irregular lumps are felt and there is some tenderness; has lost flesh.

Blood shows no malarial parasite or pigment. Some clear small moving bodies in some R.B.C.'s; leucocytes about normal, but some increase of lymphocytes. A few days after, the temperature for seven days ran higher than usual, going up to 102° twice and keeping above normal; this, however, did not seem to affect her.

July 8.—She has improved and is looking better; not so anæmic. Discharged for light work and rations.

July 17.—Returns looking ill; very pale; wasted and anæmic looking; some slight puffiness round eyes and feet; tongue very pale; spleen now reaches below the umbilicus; some general tenderness of abdomen slightly over the spleen; abdominal walls slack; skin thin and dry; urine no albumen; says she has constant fever.

Blood examined, stain shows no malarial parasite or malarial pigment; R.B.C.'s vary in size; leucocytes about normal; no relative increase of lymphocytes or eosinophiles.

Stool rather offensive; containing a good deal of bile; no ova. The temperature varied daily for the next five days, running up usually in the evening to 103° or 100° and remaining about normal, it then became less, but occasionally ran from 100° to 101° for the next three weeks.

July 24.—Looking brighter; does not now complain of abdominal pain, but some difficulty in passing wind.

August 24.—Going on much as usual, gets a good deal of dyspepsia; frequently purging at night; some tenderness over abdomen generally; spleen enlarged and easily moved; abdomen slack; is emaciated; skin dry, thin and sallow; can find nothing special about organs. Blood very watery, no malarial parasite or malarial pigment; some variation in size of R.B.C.; leucocytes appear diminished.

Stool examined on the 22nd, to-day and on 30th, and no A.D. ova found, a good deal of undigested food, and to-day's show some small active amœba.

October 21.—Saw this woman to-day, she is still very thin but less anæmic; tongue not so pale, clean and rather raw looking, has some pain in the bowels and some tenderness on pressure; has diarrhæa occasionally; spleen much enlarged, not tender; nothing special about organs; no ædema of feet; she looks a little better than she did on August 30th.

January, 1902.—I understand this woman keeps much the same and nearly died a few days ago from an attack of diarrhoea.

## Rebiew.

THE AMERICAN ILLUSTRATED MEDICAL DICTIONARY. A New and Complete Dictionary of the Terms used in Medicine, Surgery, Dentistry, Pharmacy, Chemistry, and the kindred branches, with their Pronunciation, Derivation, and Definition, including much Collateral Information of an Encyclopædic Character. By W. A. Newman Dorland, A.M., M.D., Assistant Obstetrician to the University of Pennsylvania Hospital, Editor of the "American Pocket Medical Dictionary," Fellow of American Academy of Medicine. Together with new and elaborate Tables of Arteries, Muscles, Nerves, Veins, &c.; of Bacilli, Bacteria, Diplococci, Micrococci, Streptococci, Ptomaines and Leukomaines, Weights and Measures; Eponymic Tables of Diseases, Operations, Signs and Symptoms, Stains, Tests, Methods of Treatment, &c. With numerous illustrations and 24 coloured London and Philadelphia: W. B. Saunders and Co., 1900.

This Dictionary was sent us for review. Perhaps the most convincing testimony to its value will be gathered when we state that the volume has never been allowed to be taken from our desk and that we find it of the greatest value, having occasion constantly to refer to it. Tropical ailments are so new an introduction to modern systematic medical literature, that omissions and errors might have been expected, but although we have made dozens of references to the subject of tropical diseases in the dictionary, we have on no occasion been disappointed. The number of technical names now in use are so manifold, especially in physiological-chemistry, in bacteriology, and even in ordinary medical, surgical, and gynæcological work, that a dictionary of terms, &c., is an absolute necessity for medical men.

## Correspondence.

ON THE LEUCOCYTES OF NORMAL BLOOD IN HOT CLIMATES.

To the Editor of the Journal of Tropical Medicine.

It was pointed out in this Journal, September 2nd, 1901, by Mr. Horder, that in several European handbooks on pathology of blood, one met with average figures indicating the relative number of the different kinds of leucocytes in normal human blood which do not hold good in hot climates. As a result of his investigations he gives a proportion of about 5 per cent. of eosinophile leucocytes in Europeans and 15 per cent. in Chinese. When I observed this publication I happened to be engaged at Batavia (Java) in counting the relative numbers of the leucocytes of blood in a series of natives and Europeans. I can fully I found an average of endorse Mr. Horder's conclusions. 4.9 per cent. eosinophiles in Europeans, and 13.6 per cent. in natives. The number of lymphocytes is, compared to those of European blood, increased in both of them. The total number of leucocytes per m. M.<sup>3</sup> here does not appear to differ widely from the average in Europe, 8,000—9,000. My results are published in extenso in Geneeskundig tijdschrift voor Nederlandsch-Indie, deel 42, afl. 3, blz. 211. Batavia, June, 1902. Dr. C. D. OUMEHANN.

## Rews and Notes.

THE LONDON SCHOOL OF TROPICAL MEDICINE. MR. Bomanji Dinshaw Petit has contributed a lakh (100,000) of Rupees to the funds of the London School of Tropical Medicine. The gift was made in response to the mission and influence of Sir Francis Lovell, during his journey to the Tropics on behalf of the School. At first the donation was anonymous, but Mr. Bomanji Petit has, by request, allowed his name to be published. In a letter to Sir Francis Lovell, dated August 14th, Mr. Bomanji Petit writes: "As you want my permission to declare my donation of Rupees, one lakh, to the London School of Tropical Medicine, to the public, and also to allowing my name being associated with the new building, I give my consent to do so." Mr. Bomanji Dinshaw Petit is the surviving son of the late Sir Dinshaw Maneckji Petit, Bart. The distinguished Parsee family of Petit has long been well known for its public-spirited generosity, and the present gift bears testimony that that valuable characteristic is still being maintained as a family tradition. It is to be hoped that His Majesty, on the occasion of the approaching Delhi Durbar, will signify the nation's appreciation of Mr. Bomanji Petit's many acts of philanthropy in an official manner; and were the distinction conferred upon his father bestowed upon his illustrious son, the many peoples and races interested in combating disease in the British Possessions would rejoice to know that one who has done so much for the alleviation of suffering was held in esteem by his Sovereign.

We have received the subjoined circular :-

Proposed Journal for the Army Medical Services.

It is believed that the establishment of a journal devoted to matters of professional and scientific interest would be generally welcomed by officers of the Army Medical Services, as affording to them advantages similar to those already enjoyed by other branches of the British Army, and by the medical services of Continental Powers.

The proposed journal would to a great extent take the place of the present appendices of the Army Medical Department Report, and would embrace the

following items:

(1) Original articles written by officers belonging to the Army Medical Services, and others.

(2) Bibliographical notes on articles of importance and interest to the military services.

(3) Reprints and translations from military, medical, and other journals.

(4) Official gazettes, and official information gener-

ally, bearing upon the Army Medical Services.

It is hoped that a journal conducted upon these lines will enable Medical Officers to keep in touch not only with what is going on in the British Service, but with the advances and changes that are being made in other armies.

The journal will be conducted and edited under the supervision of a committee representative of the Head-quarters Staff, the Medical Staff College, and the

Advisory Board of Army Medical Services, and to this committee Officers who have made special studies of any subject are requested to give their names as referees on that particular subject. It is also hoped that those who have a knowledge of foreign languages, and are capable of undertaking the work of reviewing and extracting information from foreign publications, will send in their names for work of that description in connection with the journal.

The Director-General would be glad if Officers would let him know their views as to the general management and contents of the proposed journal. It should, however, be stated that its pages will not be open to controversial correspondence, or to items of social or personal interest, other than what is

official.

In conclusion, the Director-General ventures to hope that there will be no hesitation in supporting this effort to maintain a high standard of professional and scientific attainment in the Army Medical Services, and he would be obliged if Officers will at their earliest convenience state whether they are willing to support the journal, it being understood that the annual subscription will not in any case exceed £1.

18, VICTORIA STREET, S.W.

July, 1902.

[We welcome the proposed addition to our literature, and we congratulate the public-spirited action of the Army Medical Staff.—Ed. J. T. M.]

## Current Miterature.

THE DIAGNOSIS OF MALARIA.—In the Medical Record for April 5th, 1902, Dr. Ford emphasises the necessity for examinations of the blood in making a diagnosis of malaria. In one series of 7,000 cases suffering from various ailments, malarial fever was stated to exist as the cause of admission, or as a complication thereof, in from 54 to 55 per cent. of all cases, the maximum being in January and February of each year, the minimum in July and August. Upon the arrival of a competent pathologist the average fell to about 10 per cent., and remained in that vicinity until the pathologist departed, when it immediately rose again. The diagnosis reached during the time of the pathologist's stay had been by means of the microscope only, due allowance being made for the recent use of antiperiodics, spontaneous convalescence, &c. The diagnosis reached at other times was clinical.

Brooke's Paste in Skin Diseases (Dreyer, Dermat. Zeit., 1902, p. 19).—This paste has the following composition:—

 Oleate of Mercury (5 per cent.)
 28 parts.

 Oxide of zinc and starch
 ... āā 7 ,,

 White vaseline...
 ... ... 14 ,,

 Ichthyol
 ... ... ... 1-2 ,,

 Salicylic acid
 ... ... ... 1 ½ ½ parts.

 Oil of lavender ... ... ... ... ... ... ... q.s.

The author has used it with success in sycosis furunculosis. A case of gangrene of the penis after cocaine injection was cured in three weeks. Syphilitic

ulcers of the vagina were cured in eight days. Good results were obtained in inflamed hæmorrhoids, and eczema, herpes progenitalis, scrofuloderma, hard chancre, syphilitic ulcers (except malignant). author attributes the success to the combined effect of the mercury, salicylic acid, and ichthyol.

PROTEOSOMA MALARIA IN SPARROWS.—Dr. W. N. Berkeley submitted specimens and described the results of some work he had done in September, 1901, on the subject of malaria in birds. It was easy in the Bronx Borough to find English sparrows (Passer domesticus) infected with malarial parasites corresponding in all morphological characters with the proteosoma of Labbé.

Dr. Berkeley had examined many hundred birds, of which 75 per cent. were infected slightly and 15 per cent. severely. The latter, though apparently well when in the open, sickened rapidly in confinement, refusing to eat, and sitting with ruffled feathers in a

corner of the cage.

The temperature of one bird reached 108.8° F. though the speaker would not venture to say that this figure represented an unusually high fever in birds. The heart-blood of one bird, examined post mortem, showed many red cells invaded by five to seven sporocytes, apparently a multiple infection. He had not found similar observations recorded in the literature, and was not able to claim that this form of infection was of proteosomal nature.—New York Pathological Society. Stated Meeting, held April 9th, 1902.

MALARIA IN TURKESTAN.—In the Roussky Vratch, June 15th, Dr. S. A. Mark states that two groups of malarial plasmodia exist in Turkestan, viz., the parasites of tropical malaria and the parasites of more temperate climates—quartan and tertian. Of 161 cases observed, the tropical parasites were eight times more prevalent than the temperate varieties in lowlying places with high temperature. In high ground, however, the temperate parasites prevailed. typhoid fever develops in malarial patients, the growth of the plasmodian seems to be inhibited for the time; when the attack is over, however, the malarial poisoning gains the upper hand. The same is true in the case of most diseases of a nature intercurrent in malarial patients. Tuberculosis assumes a very rapid course in persons suffering from malarial disease.

THE TREATMENT OF YELLOW FEVER.—After an historical review, James Carroll considers this question in the light of our present knowledge. He believes that in previously healthy subjects, free from organic lesions, the mortality can be practically reduced to zero. The primary indication is to remove the toxin. This is best done through the kidneys, aided by a moderately free action of the skin and moderate depletion by saline cathartics. Hot mustard foot-baths, sinapisms to the stomach, cold cloths to the head, saline enemas with sodium sulphate solution, are all indicated. For the first three days only milk with vichy or lime water should be given. Iced champagne is permissible. Other treatment follows along symptomatic lines. The author suggests that urea taken by the mouth or injected under the skin may serve as a

valuable diuretic .- Journal of the American Medical Association, July 19th, 1902.

THE SO-CALLED "SPOTTED FEVER" OF THE ROCKT MOUNTAINS.—In a preliminary report to the Montana State Board of Health, L. B. Wilson and W. M. Chowning state that they could find in this disease no bacterium standing in a positive etiological relation. Staphylococci of different varieties were found in the skin, and B. coli communis in cultures from the spleen. The latter organ showed in one case a special anaërobic putrefactive bacillus. So also several protozoa were present, some of which apparently found their habitat in the red blood-cells. The prevailing their habitat in the red blood-cells. The prevailing protozoon resembled the pyrosoma bigeminum of Texas fever. Apparently, spotted fever belongs rather to the latter type of disease than to the malaria group. The most probable theory as to the mode of infection ascribes the latter to tick-bites. The extreme isolation of cases of spotted fever, their occasional development in localities removed many miles from the site of any previous case, and the long period existing between the death or convalescence of the last case of any one year before the development of the first case in the following year, would point to the possi-bility of the red blood-cells of some one of the lower, warm-blooded animals being the normal habitat of the parasitic protozoon in that stage of its life cycle not passed within the body of some arachnid. Of the animals within the infected region, the common gray gopher would probably best fulfil the conditions of such a parasititism.—Journal of the American Medical Association, July 19th, 1902.

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proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the Journal of Tropical Medicine should communicate with the Editors. Editors

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

## The Journal of Tropical Medicine.

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#### Original Communications.

SLEEPING-SICKNESS AND FILARIA PER-STANS IN BUSOGA AND ITS NEIGH-BOURHOOD, UGANDA PROTECTORATE.

With Map and Diagrams-see plate.

By Aubrey Hodges, M.D.Lond Medical Officer, Uganda Protectorate.

THE present paper is founded (1) on notes and observations made on an expedition of about a month's duration, undertaken in February and March, 1902, which included the northern shores of Lake Victoria Nyanja and the adjacent islands, and during which 375 case of sleeping-sickness were examined; (2) on notes of 77 cases taken at Jinja, the Government station in Busoga, in which province lies the centre of the present epidemic; (3) on examination of the apparently sound wherever possible; and (4) on first-hand information from chiefs and others of various localities.

The first aim of the expedition was to reach the extreme outskirts of the epidemic area, where it appeared to the writer that the conditions, especially with regard to filaria perstans, could most profitably be studied. This aim, however, was not to be attained, as the epidemic had already spread beyond the legitimate scope of the expedition; nor was it possible, as had been hoped, to hear of a single island as yet unattacked by the disease. But it will be seen from Table II. (p. 297), and the accompanying map, that a line or area of lesser intensity was reached in Kavirondo, the facts gathered in which, if borne out by further inquiry, may prove to be of some importance. These facts relate to the presence in the blood of both sick and sound of filaria perstans and, taken with other facts noted during the expedition and afterwards, would seem to emphasise the importance of early investigation over a very large area, which grows larger day by day as the epidemic spreads, in order that the conditions obtaining at and beyond its borders may be ascertained.

Sleeping-sickness was found to be most prevalent in the central and south-central portions of Busoga and on the neighbouring islands. In some places many hundreds had died and thousands were found to be suffering from all stages of the disease.

History of the epidemic (Native report).-The general opinion among the Busoga and neighouring natives is that the disease came from Wakolis (a central district in Busoga). The story in Wakolis itself is that a long time ago (1892) a small number of Masai (Wakwafi from Njemps) came and settled at Wakolis; these people had many sick and at last determined, on that account, to return to their own country. As a matter of fact, they returned in batches, the last some time in 1896. About the time they were leaving, the Busoga began to be attacked by a disease which they at first thought was plague (Kaumpuli), but when they did not soon die, and they saw them nodding, they said, "This is the disease the Masai had," and they suggested that it originated with these Masai or Wakwafi. It is strange, if this were so, that nothing has been heard of sleeping-sickness in the district of Baringo (Njemps) or in Masailand, but it would seem not improbable that the Busoga first noticed the disease in their country about that time, though there is doubt as to whether the disease from which the Masai suffered was of this nature. The Busoga are of a rather low order of intelligence and have little faculty of memory, but there is general agreement that cases of sleeping-sickness began to get numerous in Wakolis country after the Sudanese mutineers passed through in 1897, and also about the time of the passage of the big caravan of the 27th Bombay Light Infantry, early in 1898. Another story, not met with by the writer, and

denied to him by several of the older chiefs, including a son of the Wakoli of that time whose land adjoined Wakolis, is that the disease came from Buda (south of Buganda proper and adjoining German East Africa) and spread along the west shore of Lake Victoria to Busoga. In that case sleeping-sickness would almost certainly have been noticed in Buda and among the more intelligent Buganda, who have been since 1890 in contact with Europeans, and it is possible that this account may refer to plague (Kaumpuli) which is endemic in Buda and the neighbouring German territory, and with which sleeping-sickness was at first, and is sometimes still, confused.

There is also a third story, an important one if true, which tells of an epidemic about 1887 in Bunyoro and Toro (west of Buganda and adjoining the Congo Free State), but this at present rests on the testimony of one native only, and has as yet

received no confirmation.

The following is the duration of the epidemic in various districts according to local report (March, 1902):—

Wakolis, five and a half to six years; Buvuma Island, two years and four months at least; Jinja, Lubas and Naniumbas, one year; Nyala, nine months; Sigula Island, six months (vide Map).

In considering the length of the above periods it should be remembered that the natives, attempting a primeval form of isolation, and until the numbers become too great, are accustomed simply to drive away into the bush such persons as are suspected of having a communicable and fatal disease, such as small-pox, plague or sleeping-sickness, and that they have hitherto hidden their sick from the sight of Europeans, probably from the unfounded fear that they themselves may be likewise driven away or disturbed on account of sickness among their people. Even now (at the time of the expedition), in spite of its prevalence, all signs of sleeping-sickness might easily escape a casual observer passing through the country. It is only when the poor creatures are stimulated by the hope of medicine or cure, that the sad crowds emerge from their huts and enclosures, or from their improvised shelters in the jungle.

Enumeration of symptoms (from 452 cases).—The enlargement of superficial glands appears to be certainly general, practically constant, and probably very early in manifestation. Any one group of glands may be more or less affected than the others, but those in the neck are the most often swollen, though the preponderance is not very marked. The enlargement is usually pronounced in children, may sometimes be very slight, especially in old people, but is seldom altogether absent. Also in the few post mortems made, the mediastinal, mesenteric and other lymph glands have been found enlarged.

No specific rash was detected, and the vast majority of cases were without rash of any kind, but harsh and dry or scaly skin is common, especially in advanced cases.

Itching and scratch-marks are very often met with, but are common in healthy natives, and scratches or scales may be masked or obliterated by inunction of the skin. The pruritus of sleeping-sickness is, nevertheless, a very constant symptom; it appears to be general and is very persistent and troublesome, being to some extent comparable clinically with the itching of jaundice.

Tongue tremor is very constant and early, and general tremor is frequently met with in well-advanced cases. Tremor of the tongue is, not very uncommonly in young people marked or replaced by jerky choreiform twitchings, which sometimes extend to the mouth, face and hands, and occasionally to the whole body. These phenomena seem generally to occur in the earlier stages, and the ages most affected to coincide with those most affected by true chorea. No heart mischief has been detected.

A peculiar thickness of speech or mumbling has been noted in many cases, and in a few stammering. This last, when it is present, seems to occur very early, and might therefore occasionally be an aid in

diagnosis.

Cerebral excitement or mania has been met with or reported in comparatively few cases, but there is reason to believe that in cases watched throughout their course it would be found to be less uncommon.

Patients sometimes complain of giddiness and falling down in the early stages, and convulsions of an epileptiform nature have been seen at a late stage in one case.

Left-sided ptosis, very marked, but clearing up entirely in about a fortnight, was seen in one case, and muttering delirium towards the last was noted

n two cases.

Most patients complain of pain about the body and limbs, but the most constant pain is headache, which is often the most distressing symptom to the patient, occurs very early, and is probably, as a rule, persistent throughout the disease. It not infrequently extends to the occiput and back of the neck. Pains in the chest and limbs are often complained of, but muscular tenderness has not been found, and although the muscles become extremely flabby and weak, nothing like paralysis has been detected.

Muscular weakness is invariable and progressive, but is often not complained of in the later stages. The staggering gait which it causes sooner or later has sometimes seemed to resemble alcoholic inco-ordination, sometimes pseudo-hypertrophic paralysis and sometimes locomotor ataxy, but as a general rule it

is atypical.

Dulness, lethargy or somnolence is sooner or later present, as described in text-books, but may be preceded by a period of headache, with tongue tremor, glandular enlargement and perhaps pruritus, and sometimes cerebral excitement or mania. During cerebral excitement lethargy is, of course, absent, and in the early stages, during conversation, attention to things of interest, or physical exertion, the patient's appearance may be quite normal for considerable periods.

It is uncommon to find pyrexia at a single examination, the temperature being usually subnormal, but all cases watched for any length of time have

shown some febrile disturbance, and this has occurred in one or two cases apparently at the very beginning of the disease.

Emaciation is rare so long as food is obtainable, but is sometimes very extreme towards the last.

Analysis of symptoms.—The statement made above, that the enlargement of the superficial glands is general, would seem to be justified by the following figures.

TABLE I.

ENLARGEMENT OF SUPERFICIAL GLANDS.

GENERAL	NECK ONLY	ONLY	GROINS ONLY	None in Neck	None Perceptible
No.	No.	No.	No.	No.	No.
366	15	3	1	18	7
per cent.	per cent.	per cent.	per cent.	per cent.	per cent.
80.9	3.3	0.6	0.2	3.9	1.5

The cases classed as general are those in which the chief groups, cervical, axillary and femoroinguinal, were all involved, with or without the submental, post-aural, sub-occipital and supra-condylar groups. It will be apparent that the glands of the axillæ and groins are very commonly affected, and it may be added that in nearly the same degree of frequency enlarged glands may be found in all the groups. The cervical, however, are the most constantly swollen. Often one side of the neck is more affected than the other, and it is curious that out of 86 cases in which the difference was noted, the left side was more affected in 61 and the right only in 25. The femoral glands are often more palpably enlarged than the inguinal.

The swollen glands are not visibly enlarged and are rarely tender, at least when the disease is fairly established, though it is possible that a subacute adenitis may sometimes be an initial or prodromal symptom. For the rest, they are of a moderate hardness, discrete and freely movable under the skin, and there seems to be no tendency to suppuration.

From the small number of cases, only 1½ per cent., in which there was no perceptible glandular swelling, it may be taken that this symptom is practically constant; but it must not be forgotten that glandular enlargement without visible cause is much more common among the natives here than in Europe, for instance; and that vermin in clothes or hair, small sores or chiggers on hands and feet, syphilis, itch and other skin eruptions will account for a good many cases of superficial adenitis, which, however, will often be localised by the lesion to which it is due.

The above considerations also hold in the case of pruritus, which is an only slightly less prevalent symptom, having occurred in 414 cases, or 91.5 per cent.

Skin eruptions were noted in 38 cases, 8.4 per cent. Of these 20 were itch, or the common papulo-pustular dermatitis of the country, which is curable by

sulphur; 12 were described as finely papular, and were generally situated on the hands and arms, sometimes also on the chest, back and legs; one was described as flat, shiny papules on hands and arms; one as fine and flattish papules, inclined to be scaly, on chest, arms and hands, with eczema between the fingers, "resembling itch"; and four as "a few scattered papules" in various regions.

Choreiform movements or irregular twitchings were noted in 57 cases, or 12.6 per cent., 34 being males and 26 females. The preponderance of males is less than it appears, for the total numbers of males and females being 292 and 260, the respective percentages work out to 11.5 and nearly 9. As regards age,\* 47, or 82.4 per cent., of the cases were under 15 years, and about three-fourths of these, again, were under 10 years, while the total number of patients under 15 years being 144, the percentage of these symptoms among them (children) was as high as 32.6. It is possible, however, that in taking these cases a certain amount of unconscious selection was used, for, in taking perhaps 40 out of several hundreds, it is difficult to omit such as are so visibly striking and interesting as these often are. The oldest female affected was 45 and the oldest male 20.

This involuntary jerky twitching is sometimes very slight, and may be confined to the tongue, while its existence in a given case might often be a matter of opinion. Only such cases as seemed well marked were noted, and in many instances it is sufficiently characteristic. It is most often to be seen in the tongue and lips, and seems to extend from there in varying degrees. It is apparently distinct from the tremor which is in greater or less degree so universal and which becomes more marked as the disease progresses, whereas choreiform movements, so far as the writer's observation goes, tend to disappear. There is want of muscular control, as sometimes shown in inability to put out the tongue at will; then, perhaps, it is protruded with a sudden jerk, when it is either immediately withdrawn in the same manner, or is clasped tightly by the oral muscles. The movements are increased or brought into notice by effort, they seem seldom to become general, and no case was seen in which they were in any sense violent. The muscles of the upper part of the face seem less frequently or less prominently involved than in true chorea, and consequently the grimacing so characteristic in this disease is much less marked. The affection may apparently be, so far as it goes, unilateral.

Choreiform movements were noted as follows:— Tongue only, four cases; tongue and face, 26; tongue, face and hands, 12; tongue, face, hands and arms, 11; general, 4.

One cannot help recalling, in connection with this interesting symptom, the old theory of "clouds of minute emboli," suggested, I believe, by Dr. Hughlings Jackson, to explain true chorea, and wondering whether perstans embryos could act as minute emboli or inflammatory centres, though the phenomena

<sup>\*</sup> Apparent ages only are given, as no native has any idea of his age.

are no doubt due to the brain changes described by Dr. Mott, however these may be caused.

The thickness of utterance or mumbling speech mentioned above is probably due to the tongue affection. A patient in the early stages with this affection of speech, or stammering, with staggering gait, tremor and perhaps cerebral excitement, might easily be supposed to be under the influence of alcohol. Indeed, one of the earlier cases seen gave at first that impression.

Cerebral disturbance, as distinguished from the stupor of later stages, was noted in 14 cases, 12 males and two females. In 11 it was described as mania and in three as cerebral excitement. It sometimes takes the form of exhilaration. The symptom appears to be usually a comparatively early one, and may possibly sometimes be initial, at least so far as the graver phenomena are concerned, but it may occur when the disease is well-developed, and may be present up to the last. There is naturally a difficulty in obtaining information from these cases, and in three the length of illness was not ascertained. In two it was given as seven and ten days, and the rest were stated to have been ill from one to three months. Of these one was said to have been mad for two months, i.e., from the beginning; in one mania supervened after he had been for nearly a month under observation, and had been ill for, probably, at least three months; and in one who was seen in a late stage, it was said to have begun very early and was afterwards reported to have persisted till the end.

With regard to the typical aspect of the patient with sleeping-sickness, there is probably nothing to be added to the graphic description given in Manson's "Tropical Diseases." But, as has been already pointed out, in the early stage the patient's appearance may be perfectly normal during what may be termed his "lucid intervals," when he may be seen talking, laughing or working like other people. These intervals may be of considerable duration at first, and there is reason to believe that it will be found that there is frequently a more or less prolonged period of malaise before any sign of lethargy becomes apparent. One must not, therefore, expect every case of sleeping-sickness to present a definite aspect, or early cases may be overlooked. When the patient is perfectly quiescent, however, even if there is no other visible sign, there is often a peculiarly sad look of aloofness and distress, such as may be seen in a stricken animal.

Most probably this facial expression is due to headache, which, as has been said above, is one of the earliest, most constant, and most persistent symptoms.

Duration of the illness.—It is difficult to arrive at a just conclusion without watching many cases throughout their course, and it is very difficult, in the present state of our knowledge, to fix, in a given case, with any preciseness, the date of commencement of the disease. But it is probable that the average duration of life among natives left to themselves, from the time the symptoms are first recognised by them, is from three to four months. The longest

period of illness given by patients at the time of examination was nine months, and a good many stated the length of their illness to be six months, but their ideas of time are very crude. A chief's wife, in whose case the time given can be taken as approximately correct, gave the length of her illness as nine months, and her death was reported about a month afterwards. It is certain that patients may seem to be scarcely ill, and die in a month's time.

The natives are generally agreed that the disease is invariable fatal.

The infection and spread of the disease.—From general observation of the epidemic and its extreme prevalence near the shores of the lake and on the islands, it would appear probable that the infection whether it be F. perstans or no, may be derived either from the water or something connected therewith; either directly or through some mosquito or blood-sucking insect.

(1) Water.—It is difficult to imagine infection pervading such a vast body of open water as Lake Victoria, though it might inhabit the swamps, pools and streams connected with the lake. But people who derive their water-supply from sources which would seem to be practically above suspicion, such as the rapidly running stream of the Victoria Nile, do not seem to be in any way immune. Also among a large number of people at Lubas, who got their water from a practically fine rock-spring, with no stagnant dipping-pool attached, which issues from somewhere near the middle of the side of a declivity of about 600 feet, F. perstans was almost invariably found and sleeping-sickness was extremely prevalent. appears, therefore, most unlikely that the infection is contained in the water itself.

(2) Fish.—What seems at present at least possible is that the extensive traffic in fish, which is carried from the coast and islands over nearly the whole of Busoga and a great part of Kavirondo, may be in some way connected with the spread of the epidemic, more probably, perhaps, through the inter-communication involved than the fish carried. This traffic extends as far as the Mpologomo River, which is the northern boundary of Busoga, but not to the further side, where, according to unanimous reports of local chiefs, there is as yet no sleeping-sickness,\* and where it seems fairly certain that at least it does not exist in epidemic form. From the river itself, however, a large quantity of fish is taken, of which several kinds are reported by natives to be identical with those carried from the lake. In north-west Busoga, where there is very little traffic with the lake, there are said to be very few cases of sleeping-sickness. It may be mentioned that the Busoga scarcely ever cook animal food thoroughly, while in times of scarcity they will eat any dead animal, or even insect, which they may pick up.

Taking native report as approximately correct, the extremely gradual spread of the epidemic in its first few years is worthy of note, and may be supposed to point to the necessity of a long period of develop-

<sup>\*</sup> It seemed doubtful whether there might not be a few cases among the Wadema.

TABLE II.
SLEEPING-SICKNESS AND FILARIA PERSTANS.

Resin	ENCE		RACE	SLEEPING SICKNE	SLEEPING SICKNESS F.P.		PER CENT.	Sound Cases		F.P.	PER CENT.
				(over 7 years	16	15	93.7	(over 7 years	. 52	41	78.8
inja			Basoga (residents)	under 7 years	4	2	50.	under 7 years	11	1	9.
,	1 23		Zacoba (residente)	Total	20	17	85.	Total	63	42	66.6
			(prisoners)	over 7 years	_	1 =	_	over 7 years	38	32	84.5
			Baganda (police)		-	-			40	26	65.
		3	Dagazaa (Pozice)	over 7 years	3	3	100	,,	_	_	_
			(residents)	under 7 years	1	1	100	,,	7	5	71.
			(100100010)	Total	4	4	100	<u>"</u>		-	
				(over 7 years	1	0	0.	(over 7 years	6	3	50.
		1.0	Sudanese	under 7 years	_	_	_	under 7 years	2	0	0.
			- 12.25% The state of the state	Total	1	0	0.	Total	8	3	37
			Lendus	_	_		- 1	over 7 years	2	2	100
			Bakedi	over 7 years	1	1	100	_	-	-	_
ganga			Basoga	,,	1	1	100.	over 7 years	2	2	100
Babanyis			,,	,,	1	1	100		-	-	_
Layangas			,,	,,	1	1	100	over 7 years	2	2	100
			,,	(over 7 years	8	8	100			-	-
Vakolis			,,	under 7 years	1	1	100	over 7 years	1	1	100
			,,	Total	9	9	100	_	_		-
			Banyoro	-	-	_	-	over 7 years	1	1	100
Kairanyas			Basogo	over 7 years	4	4	100.	_	_	-	-
Nambogwe			,,	,,	4	4	100	_	-	-	_
Gablas			,,	"	3	3	100	over 7 years	8	5	62
Tabingwas			,,	"	1	1	100	_		-	-
Kisikis			,,	**	4	4	100.	_		-	-
Banda			,,	over 7 years	5	2	40.	-	-	-	-
			,,	under 7 years	3	0	0.	over 7 years	13	10	76.
			,,	Total	8	2	25.			-	_
			,,	(over 7 years	181	172	95.	(over 7 years	34	31	91.
Lubas			,,	under 7 years	25	20	80.	under 7 years	11	7	63
			,,	Total	206	192	93.2	Total	45	38	84.
			,,	(over 7 years	30	29	96.6	— ·	-	-	_
Naniumbas			,,	under 7 years	12	7	58.3	over 7 years	12	10	83.
			***	( Total	42	36	85.7	_	-	-	-
Iagusi I			,,		-	-	-	over 7 years	13	11	84.
		- 1		(over 7 years	48	42	87.5		-	-	-
Buvuma I.			Bavuma	under 7 years	3	2	66.6	over 7 years	58	44	75.
				Total	51	44	86.2		-	-	-
			100 200	(over 7 years	0	0	0.	over 7 years	22	21	95.
		1	Baganda*	under 7 years	0	0	0.	under 7 years	6	1	16.
2 1000			<u> </u>	( Total	0	0	0.	( Total	28	22	78.
Bugaya I.			Bavuma	-		-	-	over 7 years	25	17	68•
Wima I			_ ,,		-	-	-	11	9	6	66.
Damba I			Baganda		-	-	-	**	11	8	72.
Mengo			,,	over 7 years	3	3	100	_	-	-	1 -
-0.00			"	over 7 years	5	4	80.	1. m 2. l. m	-	-	
Kyagwe			,,	under 7 years	1	1	100.	over 7 years	21	17	80
			,,	( Total	6	5	83.3			-	-
22.725			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	over 7 years	29	1	3.4	over 7 years	46	1	2.
Nyala			Kavirondo	under 7 years	5	2	40.	under 7 years	4	0	0.
			,,	( Total	34	3	8.8	Total	50	1	2.
			,,	over 7 years	41	3	7.3	over 7 years	42	1	2.
Sigulu I			,,	under 7 years	4	0	0.	under 7 years	10	1	10.
		1	,,	( Total	45	3	6.7	( Total	52	2	3.
Budi			31	over 7 years	2	2	100.		-	-	
Igagas			,,	"	_	-	-	over 7 years	5	1	20.
Dungas		• •	Bakedi	"	-	-	-	,,	3	0	0.
Bukedi				,,	-	-	100.	,,	34	29	90.
Various			Swahili	11	1	1	100.	"	7	1	14
,,	••	• •	Europeans	,,	-	-	-	,,	10	1	10
				Tarina and a second	200	000		Transport Control		000	-
				(over 7 years	393	305	77.6	over 7 years	523	329	62
		1	Total	under 7 years	59	36	61.	under 7 years	44	10	22.
		- 10		Grand Total	452	341	75.4	Grand Total	567	339	59.

<sup>\*</sup> Out of about 400 Baganda who had been resident in Buvuma 16 months at the date of examination there had been one case of Sleeping-Sickness which had already proved fatal.

ment either for the infection or the disease caused by it, and to the supervention of some special conditions, either internal or external, to account for its later rapid spread among the population. A severe famine in 1899-1890, and several periods of unusual scarcity since, together with a recent severe and wide-spread epidemic of small-pox, have probably acted as pre-disposing causes of the acceleration of its progress.

Supposing that F. perstans were shown to be the cause of sleeping-sickness, it is, of course, judging from analogy, more likely that the embryo finds it intermediate host directly in some blood-sucking insect, but, until its development has been demonstrated, the possibility cannot be excluded that certain of the fish themselves may carry it, and that Dr. Manson's original theory with regard to F. nocturna may prove to be correct in the case of F. perstans. Nor can the possibility of its being carried in this way be at present disregarded, whatever the infection may be.

Filaria perstans.—The general results of examination of the blood of sleeping-sickness patients and others for F. perstans, will be found in Table II., and the extent of distribution of F. perstans and of sleeping-sickness, so far as could be determined by observation and enquiry, is shown on the accom-

panying map.

The most striking fact shown by the table is the very low percentage of filariæ found both in sick and sound in Kavirondo, as compared with the very high percentage in other parts, even where sleepingsickness is stated to be absent. Out of 81 Kavirondo sick, F. perstans was found in only eight, or 9.8 per cent., and out of 110 sound, it was found in only four, or 3.6 per cent.; whereas, taking all other cases except Europeans, perstans was found in 333 out of 371 sick, or 89.7 per cent., and in 337 out of 457 sound, or 73.8 per cent. An attempt is made to show on the map how the areas of sleeping-sickness and of F. perstans overlap one another, the former to the east (Kavirondo) and the latter to the north (Bukedi), where, as will be seen from the table, the percentage of filariæ was as high as 90.6, being 94.4 in the neighbourhood of Mount Elgon and 71.3 in the neighbourhood of Lake Kioga. At present it can only be said that the point calls for further investigation. It would be hasty to draw definite conclusions therefrom as to the causal association of F. perstans with sleeping-sickness, since the conditions which determine the presence of the embryo in the peripheral circulation are as yet entirely unknown, and, moreover, it will be noticed that in all cases, broadly speaking, the filaria was found in a rather higher percentage of the sick than of the sound.

So far as could be ascertained at the time it was visited (March, 1902), western Kavirondo, though by no means the limit, was somewhere near the eastern boundary of the epidemic area, and though the sick were numerous, there had not been so many deaths, and fewer were seen in late stages of the disease.

Table II. also appears to show that F. perstans is less common, or less numerous, in the peripheral circulation at any rate, in young children than in

older persons and adults, with or without sleepingsickness. An arbitrary division for the sake of statistics has been made at the age of 7, but it is probable that the younger the child the less likely is the filaria to be found. The writer has not yet seen either sleeping-sickness or F. perstans in a child under 1 year old, though four cases of the former were seen at about 1½ years, in two of which the filaria was found. The earliest age at which F. perstans was found in a sound person was  $2\frac{1}{2}$  years.

A point that is worthy of further investigation is that glandular enlargement and pruritus, two symptoms almost universally present in sleeping-sickness, appear to be more common in persons harbouring F. perstans than in those who are free. The writer was first struck with the fact that this might be so at the examination of 38 prisoners on February 8th, last, when the filaria was found in 32, of whom no less than 19 showed general swelling, while six more had enlarged glands in various situations, making a total of 25; also 16, not including two who had skin eruptions, complained of itching of the skin. On the other hand, among the six who had no filaria there was found neither itching nor glandular enlargement. Three of these filariated cases with itching and glandular enlargement subsequently developed definite signs of sleeping-sickness.

A comparison has since been made between 50 cases having general glandular enlargement without visible cause and 50 with little or no enlargement. Of the former series 20, and of the latter 34, being selected cases, are not included in Table II., and it may be mentioned that in selecting it was more difficult to find cases with no glandular enlargement than the reverse. The resulting figures are not so striking as in the case of the prisoners, but are still suggestive. In the first series, 46, or 92 per cent., were found to have filariæ and nine complained of itching or bad scratch-marks while of the latter, 32, or 64 per cent., showed filariæ and none itching or scratch-marks. Against these, however, must be placed the large number of sleeping-sickness cases in Kavirondo who were examined with negative results as to F. perstans, and the majority of whom had glandular swelling.

Should further enquiry show a connection between the enlarged glands and other prominent symptoms of sleeping-sickness and infection with F. perstans, the hypothesis might become tenable that sleepingsickness itself (that is, the lethargy and muscular weakness resulting from brain-inflammation) may be but one, a deadly, but by no means necessary one, in a group of phenomena due to a filariasis in which

the parasite is Filaria perstans.

With regard to the examination of blood films, fuchsine was the stain almost always employed, after the method recommended in Manson's "Tropical Diseases." To save time a rather stronger solution was used, so as to stain in about twenty minutes, and it was found that this washed out the hæmoglobin effectually. It was also noticed that the worms are easily seen in dried films by merely washing out the hæmoglobin, without staining.

After counting the number of filariæ in many

slides, no relation could be made out as to the severity stage of sleeping-sickness, nor was there any decided difference in this respect between sleepingsickness and other cases. The largest number seen in one field (half-inch, Baker) in sleeping-sickness was 13, and the largest number in other cases was nine.

The results as to filaria in Table II, refer, as a rule, to one examination only. In 11 cases of sleepingsickness in which the first result was negative and in which re-examination was possible, the filaria was found in five; in four at the second, and in one at the third attempt. Of the remaining six cases in which the worm was not found, one was examined 16 times; three, four times; one, three times, and one twice.

No other filaria but perstans was found during the present investigations, though several cases of elephantiasis were seen, but the perstans embryos seemed sometimes to vary a little in size and manner of staining, even in the same slide. Taking extremes, it seemed possible to distinguish two forms or phases, as illustrated in fig. 1. The difference in size, as measured by the eye, appeared to include all dimensions of the worm, and not to be accounted for by thickening from contraction in length. In a lightlystained film the larger form is brightly refractile and stains faintly, while the smaller is less refractile and stains almost as deeply as the white bloodcorpuscles. In a deeply-stained specimen the larger stains in its axis only, or chiefly, while the smaller stains throughout. The larger is the less usual form. It is met with sometimes alone but generally along with the smaller, and it has occurred in all neighbourhoods and among all classes examined. No explanation is offered of these phenomena, which may be quite accidental, but they are recorded merely as of interest and for further inquiry.

Mosquitoes, &c.—Specimens have been collected where possible from all parts of the epidemic area visited, for examination by experts. For the same purpose, in addition, as many species as were available have been fed on cases of sleeping-sickness having demonstrable F. perstans. Also some specimens similarly fed have been examined microscopically, with the following results:—

A. costalis, two examined, second and third day after feeding. Filariæ found only in stomach, where some remained alive up to forty-eight hours after

A. funestus, four examined first to sixth day, no filariæ seen.

A. paludis (Theobald), one examined third day, no filariæ seen.

Culex (large, yellow and black), three examined second, seventh and ninth days, with results same as in A. costalis.

Culex (small brown), one examined fourth day, no filariæ seen.

Panoplites (Africanus of Theobald?), nine examined. In three cases, examined third day, one or two filariæ found in teasing of thorax. In one of these, which had died about eleven hours before dissection, a filaria was seen living and actually motile. Living filariæ were found in the stomach up to forty-eight hours after feeding. In those examined after third day no filariæ were seen.

Stegomyia fasciata (Theobald), two examined third day. Living filariæ in stomach up to forty-eight hours. One filaria found in teasing of thorax which appeared to show degenerative changes.

S. sugens (Theobald), two examined, results same

as in A. costalis.

Other blood-insects examined were fleas and lice taken from clothing of sleeping-sickness patients, flies resembling house-flies, fed on filarious blood, and a small dipterous insect, very like a house-fly in shape, called by the natives "bwa," which, however, could not be got to feed in captivity and appears to have a limited distribution. In all except the "bwa," filariæ were occasionally found in the stomach.

The results of the above examinations were, therefore, practically negative. No developmental changes in the filaria were observed, nor was it seen actually within the thoracic muscular tissue. And though the fact that several were found in teasings of the thorax seems to show that the worm has a certain power of migration in some species, its long stay in the stomach in most cases would count against the probability of its migration for developmental purposes to other parts of the mosquito. However, the prolonged vitality of the filaria seen in one Panoplites might be thought to cast a certain amount of suspicion on this species, especially since P. Africanus has been shown by Dr. Daniels to be filaria-bearing in the case of F. Bancrofti. Owing to the small size of the worm it is more difficult to detect in teased muscular tissue than F. nocturna, and, unfortunately, the negative results obtained cannot be said, with the apparatus at command, to be in any way conclusive.

The Panoplites of which specimens were examined, was the commonest mosquito in the epidemic area at the time of the expedition (in the dry season). It resembles Prof. Theobald's descriptions of both P. Africanus and P. uniformis, but does not seem to be quite identical with either. It differs noticeably in the colouring of the proboscis, which more nearly resembles that of P. uniformis, varying from yellow to brown at the base, and also in the markings of the legs, the femoral markings apparently differing from both species. These vary from fine white bands on a nearly black ground, to irregular ochraceous marks on brown, the mark nearest the apex being nearly always white and more or less of a band. The last two metatarsi, both of the fore and middle pair of legs, seem to be always unbanded, and the side spot seems to be always absent or nearly absent from the middle segment of the abdomen. The eyes are green in colour during life. On the whole the resemblance must be very close to P. Africanus, of which it is most likely a variety. However, the species, one or more, will be determined by experts. The larvæ of this mosquito have not been identified, but from its prevalence during the dry season it probably breeds in native waterpots or in pools on the retreating margins of the lake, swamps, &c. The deep footprints of hippopotami in the latter situations form innumerable potential breeding-places, in which larvæ of Culices and of Stegomyia fasciata have been found by the writer.

An interesting point about these Panoplites is that they were found to be infested in considerable numbers with a minute parasite resembling a tick. In some places quite 50 per cent. were attacked, and as many as nine parasites have been found on one mosquito. The same, or a very similar parasite, was also found in two instances on A. paludis (Theobald).

The acarus itself (see drawing, fig. 2) is sometimes whitish or grey, but generally orange red, the colour depending probably on the food of its host, as on a gorged mosquito it is always red. It seems to attach itself by preference to the junctions of the thorax and abdomen or of the thorax and head, but also frequently along the lines of abdominal segmentation. It appears to affect the health of its host, which is generally sluggish and does not live many days in captivity. The acarus taken from the bodies of filaria-fed mosquitoes was examined for F. perstans with negative results.

#### PLAGUE.

PREVALENCE OF THE DISEASE.

India.—During the two weeks ending August 30th and September 6th, deaths from plague in India numbered 4,862 and 5,550 respectively. The chief increases were in the Bombay Presidency (districts), Madras Presidency, the United Provinces and Mysore.

EGYPT.—During the weeks ending September 7th and 14th, the number of fresh cases of plague in Egypt amounted to 5 and 3, and the deaths from the disease to 2 and 1. All the cases occurred in Alexandria.

CAPE OF GOOD HOPE.—No cases of plague in Cape Colony since the middle of August.

Hong Kong.—On September 18th the report from Hong Kong was "No cases of plague for ten days."

MAURITIUS.—During the week ending September 25th, 5 fresh cases of plague and 4 deaths from the disease occurred in Mauritius.

#### CHOLERA.

EGYPT.—During the weeks ending September 1st, 8th and 15th, the cases of cholera in Egypt numbered 3,875, 7,758, and 9,466 respectively; and the deaths from the disease during these weeks were returned as 2,890, 6,332 and 8,278. On September 15th, 1,557 towns, villages and Ezbehs were infected throughout Upper and Lower Egypt.

Manchuria.—In the province of Mukden, between July 3rd and 14th, 757 cases of cholera were recorded, of which number 644 died, 81 being Russians and 363 Chinese. Between July 15th and 23rd, 106 Russians and 276 Chinese died of cholera.

#### Business Aotices.

1.—The address of the JOURNAL OF TROPICAL MEDICINE to Messrs. Bale, Sons & Danielsson, Ltd., 83-89, Great Titchfield Street, London, W.

—All literary communications should be addressed to the Editors.

3.—All business communications and payments should be sent to P. Falcke, Secretary to the JOURNAL OF TROPICAL MEDICINE. Cheques to be crossed London and South Western Bank, Great Portland Street Branch, London, W.

4.—The Subscription, which is **Eighteen Shillings** per annum, may commence at any time, and is payable in advance.

5.—Change of address should be promptly notified.
6.—Non-receipt of copies of the Journal should be notified to the Secretary.

7.—The JOURNAL will be issued on the first and fifteenth day of every month. Any delay in transmission should be immediately notified to the Secretary.

#### Reprints.

Contributors of Original Articles are entitled to six copies of the Journal. If reprints are required they will be supplied by the publishers, if the order is given with remittance when sending the MS. The price will be as below:—

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One page of the Journal equals 3 pp. of the reprint. If a printed cover is desired the extra cost will be for 50 Copies, 5/6; 100 Copies, 6/6; 200 Copies, 7/6.

THE

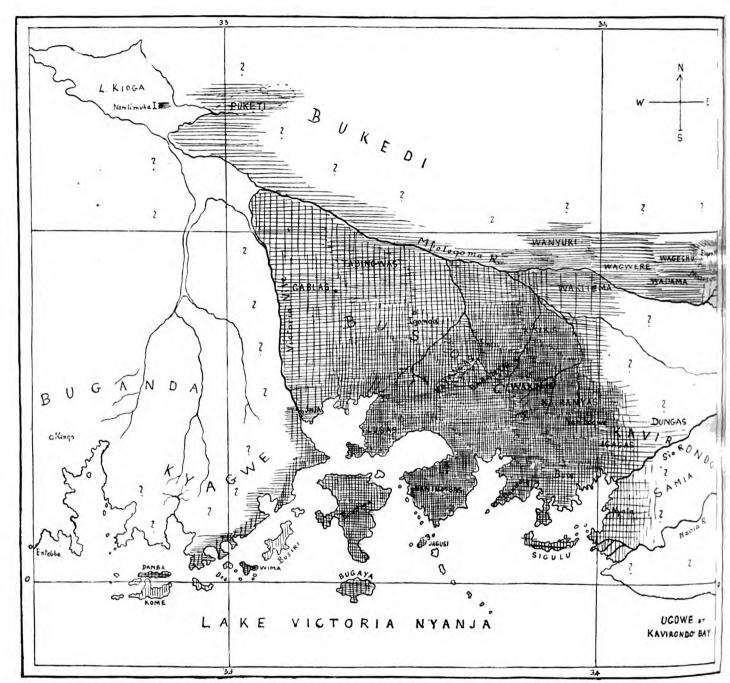
# Journal of Tropical Medicine

Остовек 1, 1902.

# PRIZE ESSAYS ON SUBJECTS CONNECTED WITH TROPICAL DISEASES.

We have the privilege of again offering three prizes for competition in connection with this Journal. The subjects chosen include one which is surgical for the most part, one which appertains to medicine, and a third which is devoted to sanitation and public health work.

We are encouraged to repeat these prizes owing to the wide-spread interest created by the last competition and by the excellent papers sent in by several competitors. The three public-spirited friends, to whom we were indebted for the previous prizes, have again come forward and most generously granted us opportunity to stimulate work in connection with tropical diseases.

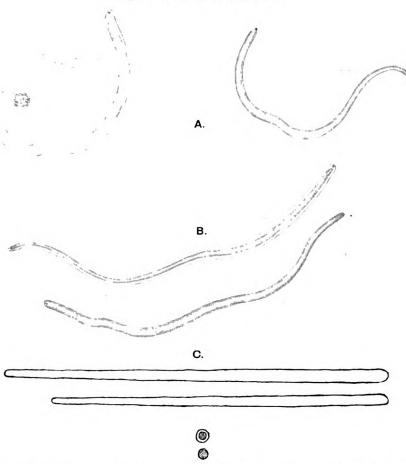
The prizes are open for competition practically to the world, as the languages in which the competitors are allowed to write are, one or other of 

MAP-DIAGRAM OF BUSOGA AND NORTH COAST OF LAKE VICTORIA.

The vertical shading indicates the distribution of Sleeping-sickness, and horizontal shading indicates F. Perstans. Intensity of shading indicates high percentage and vice versâ. The places marked north of Mpologoma River are those from which cases have been examined.

# OURNAL OF TROPICAL MEDICINE, OCTOBER 1, 1902.

Fig. I.—FILARIA PERSTANS.



- A.—From same slide, lightly stained.
- B.—From same slide, deeply stained.
- C.—To show apparent relative size.

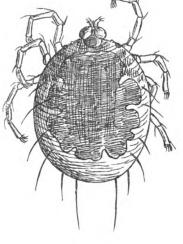


Fig. II.—TICK-LIKE PARASITE found on Panoplites and on Anopheles Paludis (?) (Theobald).

- A.—Under-side of head.
- B.—Natural size of parasite.



÷  them, known to almost all scientific men of any marked standing. We are sorry to exclude the Russian, Greek, and Arabic languages, and especially regrettable is it that Dutch and Portuguese, in which languages so many valuable communications have been made lately, should not be included. The difficulty, however, of obtaining accurate translations of scientific writings of modern medical literature is so great that we hesitate to extend the list of languages mentioned, namely English, French, German, Italian and Spanish.

The cosmopolitan nature of these competitions is evident when the nationality of the recent prize-winners is considered. The Sivewright prize was awarded to Dr. Attilio Caccini, Assistant Physician, Hospital of Santo Spiriteo in Sassia, Rome; and the Belilios prize to Dr. Bruno Galli-Valerio, Professor in the University of Lausanne. Italy and Switzerland claimed the prizes, and whilst congratulating the winners of these prizes most heartily, it is not a little surprising to find Britain, Holland, France and Germany, with their enormous colonial possessions, failing before Switzerland in a competition in which tropical experience is presumably required. Dr. Bruno Galli-Valerio, of Lausanne, however, dealt with a subject which threatens to spread beyond the tropics. His excellent paper on plague in its relation to the rat shows how a new and rare disease, to keenly scientific minds, is especially interesting. In the tropics the ailments daily met with in the routine of practice are apt to be regarded as the stereotyped setting of every-day life, and the very plethora of opportunity tends to engender neglect of the fact that every European medical man in tropical practice is as yet but part of the advanced guard, a very scout in fact, in quest of knowledge in regions unknown to science. Were these facts kept fixedly before one whilst in tropical practice, a continued interest and stimulating zeal would be the result, rendering the daily round of practice more attractive and enjoyable, and the recording of facts and figures more usual.

Records of experience in tropical practice are not likely to become stale for many years to come.

The medical man who will furnish a list of the cases he has to treat in the course of the year is rendering a valuable service to medicine. The fact that so many cases of gonorrhea, syphilis, small-pox, bronchitis, &c., &c., or such other every-day ailments, came under his care is a valuable addition to the geographical distribution of disease, and of considerable scientific importance for many other reasons. Every medical man can do this, and we shall have great pleasure in publishing them. Men in practice think that, as they have no time to investigate a subject bacteriologically, their written communications are worthless. There can be no greater mistake, as we have just attempted to show.

#### THE SIVEWRIGHT PRIZE.

The subject chosen for this competition is a most important one. Diseases of the rectum and anus are a constant source of illness in warm countries. Pruritus ani, fruitful of much discomfort and arising from and complicating many conditions and constitutional ailments, opens a wide field of study in itself. Anal fissure, painful tropical rectal ulcer, post-dysenteric ulcers, &c., in addition to the liability to hæmorrhoids, fistulæ, strictures, &c., in the tropics all come within the scope of this article. The methods of surgical treatment recommended for these conditions is of the first importance, and should form a prominent part in an essay on this subject.

#### THE BELILIOS PRIZE.

The sanitary requirements of tropical cities is still an open question. The question of the disposal of sewage, whether by the bucket system, by the cesspool system, by the separate system, &c., can only be dealt with by medical men and medical officers of health who have actual experience of tropical work. Experts acquainted only with sanitation in Europe, unless they study the climatic and geographical necessities of a particular area on the spot, are unable to give advice which can be of practical value. The sewerage suitable for the dry season is unsuitable for the wet, and the advisability of a separate storm water channel is still in abeyance. Moreover,

a city on a plain and another on a hill-side or high plateau demand that local surroundings be taken into account. The habits of the natives, their intelligence, and their power of acquiring European notions, have all to be thought of before advising on a question of the kind. We hope the military and naval medical officers may be induced to give their experience in this matter, and that the medical officers of health quartered in various tropical and subtropical towns in British, American, French, German, Dutch and Portuguese colonies may add to our knowledge on the subject.

THE LADY MACGREGOR PRIZE.

The prophylaxis of typhoid by inoculation is a subject of universal interest. Although personal observation on anti-typhoid inoculation is no doubt limited, the literature of the subject is open to every one; and an unbiassed opinion of the usefulness of the treatment may, perhaps, be better arrived at by one who studies the subject as a whole and at a distance, than by one who merely reports what has come under his own observation.

It will be observed that unless intimation is given before February 1st, 1903, that a particular prize is to be competed for, the subject will be withdrawn and another substituted for competition. It therefore behaves intending candidates to announce their intention of competing at an early date.

#### NOTICE.

LONDON SCHOOL OF TROPICAL MEDICINE.

CERTIFICATES NOW READY FOR DISTRIBUTION.

THE certificates granted to students who have completed a course of study at the London School of Tropical Medicine are now ready, and any student of the School who is entitled to the certificate should apply to the Secretary of the School, Albert Docks, London, E.

#### DYSENTERY.

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M. S.: 3ii. every hour, or until two or three evacuations are produced.

# THE PROPHYLAXIS AND TREATMENT OF BERI-BERI.

By Patrick Manson, C.M.G., F.R.S., LL.D.

Medical Adviser, Colonial Office, and to the Crown Agents
of the Colonies.

Physician Seamen's Hospital Society.

In discussing the etiology of beri-beri it is of importance that from the outset we should be in agreement as to what the word beri-beri indicates. We know for a fact that the term has been applied to ankylostomiasis, to epidemic dropsy, to sleeping-sickness, and to a variety of other diseases; and I am not quite sure that even at the present day it is always correctly employed. Indeed it is doubtful, and until we know how to isolate and recognise the specific cause, it will continue to be doubtful if we can diagnose this disease correctly in every instance. I am sometimes tempted to think that even the most experienced tropical practitioners include several specifically distinct forms of neuritis under this one term beri-beri

The history of malaria should be a warning to us in this matter. Until Laveran taught us to recognise the cause—the germ—of malaria, and thereby enabled us to accurately separate off and define the malarial group, it was often hard to say whether certain tropical fevers were malarial or not malarial. Certain it is that previously many types of fever which we now know were non-malarial were regarded and described as malarial. In the pre-Laveran age all we had to go on, both in classification and in diagnosis, were the ordinary clinical signs and symptoms, and we now know how misleading these have proved to be. In this respect, as it was with malaria twenty years ago, so is it at the present day in regard to beri-beri. Until we have discovered the germ, virus, physio-pathological condition, or whatever the vera causa of beri-beri may be, and until we know how to recognise this in our cases, we are sure to be more or less at sea in our definitions, our classifications, descriptions, and diagnoses.

Clinically beri-beri is a multiple peripheral neuritis. From the etiological standpoint, in the tropics as elsewhere, there are many kinds of peripheral neuritis. But, though etiologically distinct, all kinds of peripheral neuritis have necessarily much in common, clinically. Peripheral neuritis is a symptom, or sequela, rather than a disease. Hence a difficulty in differentiating them etiologically, that is, in classifying them scientifically, and in diagnosing morbid causes or diseases this condition belongs to.

Undoubtedly in the tropics there are cases of peripheral neuritis arising from alcohol, from ptomaines of different kinds, from minerals such as tin and arsenic, and from organic poisons developed in the body in the course of specific infections.

In beri-beri districts it must often happen that such cases are regarded as beri-beri. Indeed, it has lately been suggested that many, if not all, cases reputed to be beri-beri are really arsenical poisoning, and the fact that traces of arsenic have been discovered in the hair of such patients has been adduced in support of this hypothesis. I would not deny that arsenical neuritis is uncommon in the tropics, but I feel quite certain that what is generally regarded as beri-beri has nothing to do with arsenic, and is not arsenical neuritis. I

### Journal of Tropical Medicine.

### PRIZE ESSAYS ON SUBJECTS CONNECTED WITH TROPICAL DISEASES.

1.- A prize of the value of £10, entitled the

#### SIVEWRIGHT PRIZE,

PRESENTED BY THE

#### HON. SIR JAMES SIVEWRIGHT, K.C.M.G., LL.D.,

FOR THE BEST ARTICLE ON

"The nature and treatment of diseases, exclusive of acute dysentery, affecting the lower part of the large intestine occurring in warm climates."

2.-A prize of the value of £10, entitled the

#### BELILIOS PRIZE,

PRESENTED BY THE

#### HON. E. R. BELILIOS, C.M.G.,

FOR THE BEST ARTICLE ON

"The system of drainage and sewerage (domestic and municipal) best suited for tropical climates."

3.-A prize of the value of £10, entitled the

#### LADY MACGREGOR PRIZE,

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#### LADY MACGREGOR.

FOR THE BEST ARTICLE ON

"A critical examination of the practical value of anti-typhoid inoculation."

#### CONDITIONS.

An intending Competitor must send in his name, address, and the title of the prize to be competed for, to the Editors, "The Journal of Tropical Medicine," care of Messrs. Bale, Sons and Danielsson, 83-89, Great Titchfield Street, London, W., before February 1st, 1903.

The papers to be sent to the Editors of "The Journal of Tropical Medicine," 83-89, Great Titchfield Street, London, W., by May 1st, 1903.

All papers sent in become the property of the Journal, and will be published as the Editors decide.

The competition is open to qualified medical practitioners of all denominations and every nationality.

The papers may be written in English, French, German, Italian or Spanish.

The names of the prize-winners will be announced in July, 1903, in the public press and in the medical journals.

The judges are :-

Surgeon-General Roe Hooper, C.S.I., President Medical Board, India Office.

Colonel Kenneth MacLeod, LL.D., Professor of Clinical and Military Medicine, Staff College, London.

PATRICK MANSON, C.M.G., F.R.S., LL.D., Medical Adviser, Colonial Office and Crown Agents of Colonies.

have no doubt arsenic may be frequently discovered in the hair of beri-berics, but, considering the habits of the natives of some of the countries in which beri-beri occurs, this is only what might be expected. The Chinese, for example, frequently use this mineral in the arts, sometimes in agriculture, and very often in their tobacco. Dr. Preston Maxwell lately sent me samples of Chinese tobacco, to which arsenic had been intentionally added with the object of giving it a peculiar and much relished garlicky flavour. This is quite a common custom in China. Habitual consumers of such tobaccos, beri-berics and non-beri-berics alike, would certainly show traces of the mineral in their epithelial tissues, when these were chemically tested. This does not prove that beri-beri is arsenic. I am not aware that any correspondence in the distribution of beri-beri and in the prevalence of arsenic using customs, has been shown to exist. Indeed, in the case of arsenic flavoured tobacco, the opposite is often the case, for beri-beri is specially prevalent in such places as gaols and schools, institutions in which tobacco smoking is not permitted. Further, as an argument against arsenic being the cause of beri-beri, I would mention that it is by no means uncommon to exhibit arsenic medicinally in the later stages of the disease. I have never seen or heard of an aggravation of the symptoms by this practice. Were arsenic the course of beri-beri, such a practice would surely be hurtful. There are many other arguments, clinical and epidemiological, which might be brought forward to show that arsenical neuritis and beri-beric neuritis are distinctly different

There is, however, one form of endemic neuritis prevalent in certain parts of the tropics which, judging by its peculiar symptoms, might answer to chronic arsenical poisoning. I refer to the neuritis described by Dr. Strachan as being so prevalent in Jamaica, and probably elsewhere in the West Indies, and which is characterised by trophic skin lesions, such as are common in arsenical neuritis and implication of the higher centres—symptoms in my experience very rare,

if not unknown, in beri-beric neuritis.

We often hear of malarial neuritis, and, sometimes, of small epidemics, even of what is described as malarial neuritis. I feel convinced that the vast majority of these cases and epidemics were really beri-beri. believe there is such a thing as malarial neuritis, but, judging by my experience, it is an exceedingly rare condition, and never occurs as an epidemic. It is not enough that a neuritis occurs in a malarious district, or that it follows close on a malarial attack, to warrant the conclusion that such neuritis is malarial. Men break their legs sometimes in malarial districts, and, doubtless, even during or immediately after malarial attacks; but this does not prove that the fracture was malarial. So in regard to some recorded instance of so-called malarial neuritis. At present there is in the Seamen's Hospital, Albert Docks, a man suffering from well-marked beri-beri, who at the same time is the subject of a concurrent malarial infection.

The patient is a Danish seaman, sixteen years of age. Last December his ship was on the Congo, and there, on the 25th of the month, he got his first attack of fever. It was tertian in type, and was promptly checked by quinine. The ship sailed for Santos, in

the Brazils, on January 14th. On the voyage he had a recurrence of his fever, which was again checked by quinine. The ship left Santos for Falmouth in March. Three weeks out his legs began to swell. Presently the ædema extended to the trunk, and he suffered much from breathlessness and palpitations. During the last fortnight of the voyage he was unable to walk. On arrival in Falmouth he went to hospital, where his case was regarded and treated as one of beri-beri. He remained in Falmouth for a month and then came on to London. On admission to the Seamen's Hospital, on July 9th, his temperature was normal, but it was noted that his heart was extremely irritable. He had marked foot-drop, hyperæsthesia of the calf, thenar and hypothenar muscles, weakened hand grasp, absent knee-jerks, numbness of shins, high stepping gait, and other signs of peripheral neuritis. The œdema had disappeared. His spleen and liver were markedly enlarged. On the following day his temperature rose to 101.4, and on microscopic examination malignant tertian parasites-fever forms-were found in his blood. After a day or two he was put on euquinine. His fever quickly yielded, but by July 17th crescents had begun to appear in the peripheral circulation.

There can be no question but that this lad was the subject of a malarial infection and concurrent beriberi. The blood examination proved the malaria, and the character of the symptoms, together with the fact, which he mentioned, that one of his mates had died on the voyage with dropsical and paretic symptoms exactly like his own, proved the beri-beri. As malarial neuritis is a rare disease, it is in the highest degree improbable that two cases of a very rare condition should thus occur simultaneously in one ship's company.

In the same ward with this patient there is another malarial case with pronounced tubercular disease of the lungs. The usual physical signs and tubercle bacilli in the sputum are present. The neuritis in the one case is no more the result of the concurrent malarial infection than is the tuberculosis in the other.

The diagnosis of the different forms of peripheral neuritis is often from the clinical symptoms alone extremely difficult, if not impossible. If I were asked what clinical points I would rely on in making a diagnosis as between beri-beric and malarial neuritis, I would say, for the former, marked proneness to cardiac implication; for the latter, impairment of memory. We have as an out-patient at the Seamen's Hospital just now a man who, last October and November, had severe and well-marked malarial fever when in Northern Nigeria. He was treated with quinine and got over the fever but immediately developed intense neuritis which, in a short time, culminated in complete paresis of the lower limbs, weakness of the upper extremities, and a high degree of hyperæsthesia of the calf muscles. At one time he was quite unable to walk. He is now slowly recovering and can walk a mile or two without much difficulty. I have seen a good many similar cases from West Africa and am often puzzled about their diagnosis. One and all, including the patient I have just referred to, have complained of loss of memory-"West Coast memory" it is called in that part of the world, where it is a

well-recognised condition. I have not remarked this loss of memory in beri-beri. It is certainly often a pronounced feature after malaria. I have seen patients in whom this loss of memory has been complete. I am attending just now a gentleman, fifty-one years of age, who, after a short stay on the West Coast, contracted a severe malarial infection. This was in March of this year. Since that time his memory for events occurring during and after fever is a complete blank. He is not very anæmic, but his spleen was a short time ago distinctly enlarged, so that there can be little doubt as to the nature of the fever he suffered from. He can converse quite rationally on matters referring to dates antecedent to his fever, but his memory for recent events is so bad that he cannot tell even what he has had for breakfast five minutes after he has eaten it. I may be wrong, but I think this point of loss of memory is of some diagnostic value in deciding between a malarial and a beri-beric neuritis. It is of less value in diagnosing certain other forms of neuritis from the malarial type, for we know that alcohol and the toxins resulting from a variety of other infections, and diseases producing anæmia, often give rise to the same condition.

Whilst fully recognising its inadequacy and the possibility that it covers forms of neuritis other than beri-beri, I would suggest the following features as a basis on which to found our recognition of that disease as a distinct form of multiple peripheral neuritis, and as more or less distinguishing it from other pathological groups with neuritis as their leading clinical phenomenon: (1) Our ignorance of its cause. (2) Its occurrence as an endemic and epidemic disease. (3) Its proneness to produce cardiac disability and dropsy. (4) Non-implication of the cranial nerves with the exception of the pneumogastric. (5) Non-implication of the intellectual and emotional centres. (6) Rarity or complete absence of trophic skin lesions. (7) High rate of mortality under certain conditions.

I shall take it, but always with the reserve I mention, that a neuritis exhibiting these features is beri-beri.

In considering the etiology of a disease, it is convenient to divide the subject into (1) the immediate cause—germ, toxin, inadequate or improper food, traumatism or whatever it may be; (2) the means by which, or the medium through which, the cause is applied; (3) the circumstances personal to the individual which influence his receptivity and susceptibility; (4) the physical conditions external to the patient, favourable or the reverse, to the application and operation of the cause.

It is a somewhat humiliating fact that, although beri-beri is a disease of first-class importance in the tropics, although it exhibits peculiarities in its epidemiology so striking that they seem to suggest that surely the cause cannot be hard to find, and that although not a few investigators, medical and lay, have diligently set themselves to find this cause, we are about as ignorant of its true nature and of the medium in which it is applied, and of the other etiological circumstances, as was Bontius when he wrote about beri-beri over 250 years ago. Quite recently there may have been some advance, but even these recent advances are more in the direction of

showing what beri-beri is not, rather than in the

direction of showing what it is.

I think I shall best provoke useful discussion if I state my own view on the etiology of the disease, giving briefly some of the facts and arguments on which these views are founded and, in the course of this exposé, discussing or alluding to other current hypotheses.

Assuming and once more emphasising that I do not lose sight of the fact that it is an assumption that we are dealing with only one form of neuritis in what we call beri-beri, I hold that this neuritis is produced (a) by a toxin, (b) the product of a germ operating in (c) some culture medium (d) located outside the human body. Further, I hold that (e) the said toxin enters the body neither in (f) food, nor in (g) water; and am thereby forced to conclude that it is introduced (h) through the skin, or (i) that it is inhaled.

I may be all wrong in this view; to-morrow some new fact may upset it. But for the present this is the result of my study of other men's work and of my own observations. At all events it is the thesis I propose and am prepared to defend. The various points advanced I shall deal with seriatim, but necessarily briefly. I shall allude in some detail to certain recent, and some of them unpublished, observations, saving time by assuming your acquaintance with the less recent literature of the subject.

(1) The immediate cause of beri-beri is a toxin.

The analogy of many, possibly, with the exception of leprosy, of all known forms of peripheral neuritis encourages this view. But besides analogy we have other and direct evidence in support.

It is now generally recognised that the most important measure in the management of a case of beri-beri is removal of the patient from the place in which he sickened. If this be done at a stage of the disease sufficiently early, and, provided the dose of virus has not been overwhelming, in the course of a short time—generally a week or ten days—the symptoms begin to mend, at all events not to advance, and, if the patient survive the first fortnight after removal, he almost invariably recovers. On the other hand, his mates who may have been left in the endemic spot will continue to be ill for months, and many of them will very likely die.

This is our experience at the Seamen's Hospital, Albert Docks. The figures I have already published, and therefore need not repeat them. I prefer to bring forward later and more extensive evidence, collected by one who at the time was committed to no opinion.

Dr. Travers, of the Federated Malay States Medical Service, in a paper which I trust will be published soon, states that the new gaol in Kuala Lumpor—the Pudoh Gaol, as it is called—was occupied for the first time in January, 1895, the building which has come to be known as the Old Gaol being vacated at the same time. For many years no case of beri-beri had arisen in this Old Gaol. In the month of August following the transference of prisoners beri-beri broke out in the new or Pudoh Gaol. The mortality ran high. No fewer than thirty-two cases occurred in September, and there was a case mortality of 31.7 per cent. The authorities, remembering its salubrity as

regards beri-beri, on and after October 1st retransferred all the cases of beri-beri in progress at the Pudoh Gaol to the Old Gaol, and also all cases subsequently originating there. Immediately the case mortality began to fall; from the 31.7 per cent. in September in the Pudoh Gaol, it fell in the Old Gaol in October to 15.57 per cent.; in November to 6.15 per cent.; and in December to only 4.25 per cent.

On this and similar experiences I argue that the cause of beri-beri cannot be a germ living and multiplying in the body of the patient, for, if it were such, the patient when he left the endemic spot would still carry the germ with him, and the disease it produces would continue until immunity had been acquired. You cannot get rid of a scarlet fever infection, or of a small-pox, or of an ague, or of a syphilis, merely by leaving the place where the germ of these was acquired. But you can get rid of a toxin in this way, and if the dose of toxin is not renewed the effects of the initial dose will gradually subside. Stop his drinks, and the subject of alcoholic neuritis after a week or two, if he survives, begins to mend.

Pekelharing and Winkler, who regarded beri-beri as an infection by a bacterium, attempted to get over the difficulty suggested by this fact of the improvement of patients on leaving the endemic area, by assuming that the bacterium is and must be frequently introduced into the body by repeated infections. This is a roundabout way of getting over an obvious objection to their germ infection theory. Their assumption is quite unsupported either by fact or analogy. Moreover, the germ they supposed to be the cause of

As you are doubtless aware, so-called beri-beri germs have been described as occurring in the blood of beri-beri patients. Very few observers have found the same germ, and many careful observers have failed to find any germ whatever. The latest observations in this direction with which I am acquainted are those

beri-beri is now quite discredited.

to find any germ whatever. The latest observations in this direction with which I am acquainted are those by Dr. Arthur Stanley, Health Officer of Shanghai. They appear in the current number of that valuable publication, the Journal of Hygiene. Dr. Stanley summarises his work as follows: "Thirty cases (of beri-beri), where the symptoms were well-marked and in stages both before and after loss of knee-jerks, were examined. A band being placed round the arm to distend the veins, the bend of the elbow was sterilised by 10 per cent. lysol in strong alcohol repeatedly rubbed in for half an hour, and then washed with ether. The needle of a sterile all metal syringe was plunged into the median cephalic vein, and 1 ccm. of blood withdrawn. The blood was examined under the microscope directly, and was stained with methylene blue, with a negative result. Tubes of peptone bouillon, gelatin, agar, and blood serum were inoculated with two or three drops of blood in each; deep stabs in glucose-agar were also made. Beyond the adventitious inoculation by Staphylococcus aureus and M. tetragenus respectively, of two out of 150 tubes inoculated, all remained sterile. Six rabbits were injected simultaneously with 1 ccm. of blood from six

well-marked cases of beri-beri, but nothing resulted."
I fancy had Pekelharing and Winkler and their followers worked as carefully as Dr. Stanley did, we would have heard less about bacteria in the blood of beri-berics. Observe, Dr. Stanley sometimes worked

with blood from cases before the loss of knee-jerk; that is to say, during the period, were the cause of beri-beri bacterium in the blood, when, presumably, they would be proliferating and in greatest abundance.

I hold, then, that the established fact that beriberics begin to recover shortly after they leave the endemic area proves that the disease is not an infection by a bacterium or other germ proliferating in the tissues.

(2) The toxin of beri-beri is produced by a living germ.

The proof of this lies in the circumstance that the disease can be introduced into virgin country and there spread. That is to say, the hypothetical cause is capable of being transported and of multiplying. Spontaneous multiplication is a property peculiar to living things. Therefore the originating agent of the toxin of beri-beri is a living thing—a germ.

There are several recorded instances of the introduction of beri-beri into virgin country; for example, by the Japanese into Fiji, and by Annamites into New Caledonia.

In the first instance the disease did not spread to the aborigines; it might, therefore, be suggested that there is no valid proof of multiplication in this case. It might be advanced that each Japanese patient had been infected beforehand in Japan, or in the ship that brought them, and that the infection did not manifest pathogenic properties until certain favouring conditions were experienced in Fiji. The objection, I must say, is somewhat far-fetched, but, granted it might apply in this particular instance, it does not apply to the New Caledonian epidemic, for in it the disease spread from the immigrant Annamese to the aborigines. Nor can it apply to the following very telling and, I believe, hitherto unpublished instance, the facts of which have been but recently reported to the Colonial Office by

Dr. J. Bolton, Sanitary Warden, Mauritius. Diégo Garcia (7° S. 72° E.), the southernmost island of the Chagos group, is a dependency of Mauritius. It is a narrow, horse-shoe-shaped sandbank some thirty miles in length. The soil is principally sand overlying coral. Here and there there is a certain amount of vegetable loam. Vegetation is luxuriant; there are a few forest trees, but for the most part the island is occupied by cocoa-nut plantations. The population amounts to 466, divided between two stations, the larger of which contains 326 inhabitants, the smaller 140. The former, the settlement with which we are concerned, is called Pointe de l'Est. The people, who belong to the African, Malagasy, and Indian races, are well-housed, well-fed, and for the most part healthy. Anopheles mosquitoes are absent and there is no indigenous malaria. There are no important endemic diseases unless it be trismus neonatorum and dysentery. Until recently beri-beri was unknown.

On June 27th, 1900, nine Johannese coolies—eight men and one woman—were landed on this island. Seven of them, it was noticed, had sore eyes, sore mouths, sore gums, and swollen feet. One complained of pains in his legs and walked with difficulty. Three days after their arrival two of them—A and B I shall call them—applied for hospital treatment.

A had swollen and painful legs and a distended epigastrium. Nothing very particular occurred to him

till the month of January—that is, seven months after his arrival on the island. He then complained of dyspnœa, palpitations and general œdema, and his pulse was irregular. He died suddenly on the 15th of the same month.

B had pains in, and cedema of, the legs, but no cardiac distress. He recovered in about a fortnight,

apparently in consequence of a purgative.

On August 6th, that is, seven weeks after landing, C, another of the same batch of Johannese coolies, was sent to hospital with swollen and painful legs. For a time he was treated as an out-patient, but he, too, early in January, feeling worse, applied for admission. His legs were swollen, painful and tender; his epigastrium was distended, he had much cardiac distress and an irregular pulse. He died suddenly on January 12th.

In August, D showed similar symptoms, but they gradually disappeared, leaving his legs paralysed.

E also became affected, and along with D and the other surviving Johannese, was sent back to Mauritius in June, 1901.

Five, therefore, out of the nine Johannese were attacked with beri-beri, two of them dying with

characteristic suddenness.

Up till the month of March, 1901, none of the other and older residents on the island had been attacked; but on the 27th of that month, the hospital assistant was seized with urgent symptoms of beri-beri, and died suddenly on April 8th. On March 25th, a second resident was observed to be affected; he also died suddenly on April 28th. On April 29th, another death occurred, his case dating apparently from March 15th. On May 9th, a fourth was seized and died suddenly on the following day. On May 10th, a fifth, a woman, was attacked; she died on the 22nd. On June 11th, a sixth, the husband of this woman, fell ill and died five days later. On June 15th, their child sickened in the same way, and died on June 23rd. Between the last date and July 1st, when the epidemic ceased abruptly, nine additional cases occurred, but all of them recovered, although at the time of Dr. Bolton's visit, six weeks later, some of them showed wellmarked paresis and atrophy of the legs.

Dr. Bolton attributes the spread of the disease to the islanders to germ infection derived from the Johannese immigrants; but he does not explain satisfactorily why it ceased to spread, why the islanders themselves did not acquire infective properties. He does mention however, what to me seem to be two most important facts: (1) The surviving Johannese and, it is to be presumed, their filthy belongings were deported on June 11th; and (2) the huts in which they had resided were burned down. Observe, three weeks after this the epidemic, which, seemed to be gaining strength up

to that time, abruptly ceased.

This account of the epidemic of beri-beri in Diégo Garcia, which I have condensed from Dr. Bolton's very lucid narrative, distinctly proves that the toxin of beri-beri can multiply, and therefore that the generator of this toxin must be a living organism—a germ.

(3) The toxin-producing germ operates in some culture medium. This need not be discussed; the proposition is self-evident.

(4) That culture medium is located outside the

human body.

Given that beri-beri is produced by toxin, and that

there is no germ in the bodies of beri-berics (as I have sought to prove), it follows that the culture medium also must be outside the human body.

I would point to the analogy of alcohol and alcoholism by way of illustration. Alcohol, the toxin which gives rise to alcoholic neuritis, is produced during the proliferation of a germ—the yeast plant—in a saccharine solution. We may swallow the germ—the yeast plant—with impunity, and we may swallow the culture medium—the saccharine solution—even with benefit; but the product of the operation of the germ on the culture medium—alcohol—the toxin produced outside the human body, is a poison. So I hold it to be with regard to the germ, culture medium and toxin of beriberi. What the equivalent of the saccharine solution may be I cannot conjecture, any more than I can point to the germ or to the toxin.

This much, however, I assert:

(5) The toxin of beri-beri does not enter the human

body in food.

I had arrived at this conclusion long ago, but only by a process of exclusion and on epidemiological grounds; until recently I was unable to point to any direct or experimental proof. This has now been supplied by Dr. Travers, of Kuala Lumpor, and I have no hesitation in saying that his brief but long-witheld paper is far and away the most important contribution on the etiology of beri-beri extant. True that his results are entirely of a negative character, but they effectually sweep away a mass of crude conjecture and narrow down very much the field for future investigation.

For long it has been conjectured that beri-beri depended on food; either on the nutritive value of the food, or on a pathogenic germ introduced into the patient's body with the food, or on an organic toxic agent contained in the food. As an example of the first type of conjecture I would instance the nitrogen starvation theory, founded principally on the experience of the Japanese navy; of the second, Rost's observations on his rice micrococcus; of the last, Miura's fish poisoning and Braddon's germ—altered rice hypotheses. Many arguments and many facts have been brought forward in support of each of these, but to my way of thinking each and all of them are effectually and permanently disposed of by Dr. Travers' observations.

In Kuala Lumpor, in 1895, there were four large institutions under the care of the Medical Department of the State of Selangor, namely, the District Hospital with 450 beds, a Hospital for Incurables with ninety beds, and a gaol with (as I infer from Dr. Travers' paper, although it is not distinctly stated therein) some 350 prisoners. In none of these institutions, with an aggregate of about 1,000 inmates, had a single case of beri-beri ever originated, nor, for that matter, up to the time of Dr. Travers' report did one originate.

As already mentioned, in January of the year referred to the New, or Pudoh, Gaol, situated a mile and a half from the Old Gaol, was occupied. Within six or seven months from the date of its occupation the prisoners in this new gaol were attacked with beri-beri and the disease has stuck to it ever since.

The food supplied to each of the five public institutions mentioned, at all events the rice, was of the same kind and of the same quality. It was obtained from Penang by the same contractor, and in no instance was it stored in Kuala Lumpor for longer than three weeks. Manifestly, if rice be the cause of beri-beri, in the case of the Pudoh Gaol the change it must have undergone to render it pathogenic must have taken place after it was received at the Pudoh Gaol.

I have already referred to the favourable effect on the sick of a transference from the Pudoh to the Old Gaol, an effect in itself highly suggestive of a pathogenic nidus in the Pudoh Gaol. But a further and more telling experiment was instituted, which not only showed the existence of this nidus in the Pudoh Gaol, but conclusively demonstrated that this nidus was not

in the food supply.

On October 21st sixty healthy prisoners were transferred from the Pudoh Gaol to the Old Gaol, and from this date till July, 1896, a large number of prisoners (from 72 to 133) were housed in the Old Gaol. The result is startling. Whereas there occurred during these months in the Pudoh Gaol, in a prison population of from 271 to 337 souls, twenty-one to forty-seven fresh cases of beri-beri monthly, not one case of the disease originated in the Old Gaol. Further, from October 1st to December 14th, 1895, the food for the beri-beri cases and the food for the healthy prisoners now located in the Old Gaol was precisely similar in every respect to the food consumed by the beri-beri stricken population of the Pudoh Gaol.

Not only was it similar in every respect, but it was actually cooked at the Pudoh Gaol in the same vessels and at the same time as that for the Pudoh Gaol inmates, that for the inmates of the Old Gaol being conveyed there twice daily in a hand-cart. After December 14th the rations for the prisoners in the Old Gaol were cooked in that building, raw rations, with the exception of rice, being sent daily from the stores in the Pudoh Gaol. The rice came from the same contractor, and was undoubtedly from the same stock in the case of both gaols, as well as in the case of the three other and beri-beri free institutions already alluded to as being under the charge of the local medical department at Kuala Lumpor.

The inference from this notable and, to my mind, conclusive experiment cannot be avoided. Beri-beri has no direct, if any, connection with food, most certainly not with rice. To have this proved is a great step in advance, and I feel sure that you will agree with me that Dr. Travers is to be congratulated on the excellent use he has made of an exceptional

opportunity.

Dr. Travers' paper is directed more particularly against the various hypotheses associating rice with beri-beri. He specifies, however, that "all food" was sent during the time this experiment lasted from the beri-beric to the non-beri-beric gaol. I can imagine some one suggesting that possibly some element in the diet of the Pudoh Gaol prisoners, some element in which resided the cause of beri-beri, was not sent to the Old Gaol. But it is difficult to imagine what, under the circumstances, this element could be, and still more difficult to believe that from 1895 to 1901, the six years during which the Pudoh Gaol has been ravaged by beri-beri, this element has been constantly supplied to the prisoners there, but has never been supplied to the prisoners in the Old Gaol, nor to any of the other three institutions at Kuala Lumpor catered for by the same contractor.

One other point I would remark on. Dr. Travers' experiments were made in 1895. He did not print them till 1901. Depend upon it, had he, in the interval between 1895 and 1901, seen a single flaw in the evidence or other source of fallacy, and no one was in a better position to detect such, he would not have brought forward his work.

From this and other evidence I conclude that the

beri-beri toxin is not conveyed in food.

(6) It is not conveyed in drinking water. This is easily proved. Two institutions placed side by side—as, for example, the male and female prisons in Singapore, with identical piped-water supplies—one, the male, is attacked with beri-beri, the other, the female, is exempt. It is not necessary to labour this

point. Proofs are numerous.

We may conclude, therefore, that it is now apparently proved, so far as negative evidence can prove anything, that the virus of beri-beri is conveyed neither in food nor in water. Apart from the influence of high temperature and moisture in favouring the multiplication of organisms, obviously meteorological conditions have no direct bearing on its production. These cannot be transported, and are not so capricious and limited in the details of their distribution as is beri-beri.

I have shown, I hold, that beri-beri is not caused by a germ operating directly in the human body; therefore beri-beri cannot be passed as an infection directly from person to person. I believe I have shown that beri-beri is the result of a toxin generated by a germ located outside the human body, and I have shown that this toxin is not conveyed in food or in water. We must conclude, therefore, that the virus of the disease is conveyed to man either by the air, or through the skin by contact, or by means of some insect or other animal which inserts it under the skin, or by a combination of some of these ways. So far, unfortunately, we have nothing to show either what the toxin is, nor the germ that produces it is, nor what the precise nidus in which it is produced is, nor the way by which it gains access to the body. Whatever the nidus of the toxin-generating germ may be, both nidus and germ are intimately associated with man; one or both have a wide general distribution, but a very limited particular distribution, and both can exist in ships on the high seas as well as in men's houses on shore. Whoever succeeds in reading this etiological riddle will confer an immense boon on multitudes of our fellow men, for it is reasonable to expect that when a cause, requiring conditions so complicated as those demanded by the toxin-generating germ of beri-beri, is once known, it can readily be controlled if not abolished.

When I set myself to write out these remarks, I intended they should include something about the influence of overcrowding, of weather, of labour, of traumatism, and other circumstances on the etiology of beri-beri; but I find, in dealing with the more immediate cause of the disease, I have already arrogated to myself more than my proper share of the time at our disposal. I trust, however, although in opening this discussion I have said little or nothing on these points, they will not be neglected by the speakers

who are to follow me.

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#### Original Communications.

# IS SLEEPING SICKNESS OF THE NEGROES AN INTOXICATION OR AN INFECTION?

By Dr. Hans Ziemann.
Naval Staff-Surg., H.M.S. Moltke.
(Translated from the German by P. Falcke.)

As far as I know, no case of sleeping sickness of the negroes has hitherto been described in a German Colony. F. Plehn states that he was once informed of two cases in West Africa by his native servants, which terminated fatally after a short time. He does not, however, mention to which tribe the two negroes

in question belonged.

Sleeping sickness of the negroes (known as negro lethargy, Congo sickness, sleeping sickness of West Africa, maladie du sommeil doenca de somno, rit ansi, &c.) occurs from Senegal down to Angola, and is manifested by sleepiness which finally deepens into complete stupor, and which, after several months or more, rarely after years, leads to a fatal termination through coma from inanition. We shall presently refer to the clinical symptoms. The disease is also reported from the West Indies and British Guiana in negroes that have been imported from West Africa; according to Ferguson, however, cases also occur in Guiana, in native Indians. In Trinidad, where I stayed over three weeks, as also in Jamaica, St. Thomas and Venezuela, I took great pains to search for cases, but without the slightest success. On the coast of Venezuela, where I became acquainted with nearly every place, the disease at all events occurs very rarely. This circumstance is remarkable from the fact that Ferguson attributes the disease in Guiana, which is close by, to infection through anchylostomum, and I was able to confirm anchylostomiasis as occurring apparently very frequently on the littoral of

In Africa, one is aware that the disease only appears

in certain districts, whereas it is not observed at all in regions near by, and that, moreover, it often appears suddenly. In Cameroon, I have never been able to find the disease amongst the native Duala, though diligently sought for. In fact, the disease does not seem to occur at all in this tribe. It is exceedingly characteristic that no undoubted case of sleeping sickness ever seems to have been observed amongst white people, and, moreover, that children under three years of age are very seldom attacked. This fact will be elucidated below.

During my official term of medical practice in Cameroon, 1899-1900, I heard that the disease, which was known to have raged on the Congo for a considerable period, was also causing great loss of life in North Angola, where entire villages were said to be depopulated by its ravages. I therefore requested Dr. Gleim, formerly Consul and at present physician to the Legation, who was leaving for Loango, to direct his attention to this matter; and I communicated the points of view to him which appeared to me to have an etiological bearing on the question. Dr. Gleim was good enough to convey his first impressions to me in writing, and he published a remarkably interesting report on the disease in Arch. f. Schiffs und Tropenhygiene, 1900. I intended myself, at the end of my medical term of office in Cameroon, May, 1900, to go first to the Congo and afterwards to North Angola in order to study the disease, and had already obtained recommendations from the Government to the local authorities, when it was found that the usual steamers, for certain reasons, would be unable to carry me from Victoria to the Congo.

Therefore, instead, the relations of mosquitoes to malaria in Victoria, and in Togo in Upper Guinea, were confirmed.<sup>1</sup>

<sup>1</sup> H. Ziemann: Ueber die Beziehungen der Mosquitos zu den Malariaparasiten in Kamerun (Deutsche med. Wochenschr., 1900, No. 25); "Second Report on Malaria and Mosquitoes on the West Coast of Africa." Lecture before the International Congress in Paris. (Deutsche med. Wochenschr., 1900.)

I had previously succeeded in observing an interesting case of sleeping sickness, which afforded the opportunity for a few experiments. Incidentally, during a medical journey of inspection from Cameroon to Victoria, in Victoria, on February 10th, 1901, I came across the negro, Jamba, suffering from sleeping sickness. The man belonged to the constabulary—a Wey negro from Upper Guinea—and was supposed to be suffering from the disease for three months. The illness set in with sleepiness and headaches increasing in intensity. He has been in Victoria for one year, and, a circumstance that is not without importance, was in the same household with several agriculturists. These persons, besides their wages, receive weekly from the Government a ration of rusks and salted pork; more rarely fish. They have to provide their own vegetables, &c. I observe that the members of each tribe of negroes abroad mostly

fraternise, even cooking together.

Jamba had previously, it seemed, been in Batanga for two years. In his native land, since his maturity, he appears to have suffered periodically from mild fever. In Batanga he had seemingly always been healthy, and never had a venereal disease. He had never been homesick, and had never been fond of work-in this respect, therefore, a normal negro-and was not given to more alcoholic excess than any other negro. The data above mentioned are given in literature as the etiology of the disease. He had not had sexual intercourse for a long time, as "he always fell asleep soon," nor had he erections for a considerable period. Assertions of a negro as to time or to personal matters cannot be relied on unless backed up by the statements of others. Conversation was conducted by means of an interpreter. In Victoria he contracted the skin disease, designated craw-craw by the country folks, from which negroes, otherwise quite healthy, often suffer. Jamba states that he ate a great deal of rice in his native land, and that in Batanga he partook of much manioc, or cassada. Through the interpreter, I was also informed that in Wey-land, in Upper Guinea, much manioc was also eaten, and there eaten more frequently raw than in Batanga, where, as far as he knew, it was always cooked. In order to be further observed Jamba was taken back to Cameroon and placed in the hospital for blacks.

Clinical History.—A very powerfully-built, dull-minded, and sleepy-looking Wey-negro, well-nourished, and 20-25 years of age. He answers questions reluctantly, but concisely, muttering them between the He always seeks for a support when standing, and without support staggering is always apparent. His gait without support is reeling and staggering. Nevertheless, he can walk without assistance, but after fifteen or twenty steps he feels his way along the

wall or bedsteads.

The conjunctivæ are slightly injected, his gaze is vacant and expressionless. The skin exhibits that yellowish-brown tint often peculiar to the Weys in contradistinction to the brownish-black colour of the Bantus, but otherwise there are no anomalies of pigment or atrophy such as is the case on the backs of the hands in pellagra. There is slight craw-craw, causing considerable itching on the skin of the thighs, on the chest and abdomen, and more particularly on

the inner surface of the thighs. This eruption, however, is said to have been present before the itching from which he now suffers became so severe. The erythema consists of a sort of dermatitis nodosa, which in Cameroon is frequent, particularly in the Bush and Croo negroes from Upper Guinea, but which I have never seen in Europeans. Through the confluence of the small nodules, varying in size from the head of a pin to a hemp-seed, the eruption in Jamba—as frequently happens in such cases—consisted of a few beet-like, hard, flat, protruberant agglomerations, on the periphery of which there were isolated fresh papules. In contradiction to F. Plehn, I failed to transmit the disease in two other cases of dermatitis by transferring scraped material from such agglomerations on to the scarified skin of other negroes.

There were a few vaccination cicatrices on Jamba's left upper arm. The skin was very dry, but otherwise there was no exantham or cedema. The inguinal glands on both sides were partly enlarged to the size of a pigeon's egg, they were fairly soft and not sensitive to pressure. The occipital, cervical and supraclavi-

cular glands were not enlarged.

Temperature 36° C. Pulse 60, regular, fairly strong; the radial pulse was somewhat tense. Respiration regular, 24 to the minute, somewhat superficial

breathing, costo-abdominal.

Special Symptoms.—Jamba is undoubtedly somewhat stupefied, and can only be kept awake for a few minutes by steadily staring at him, after which he assumes a lateral position, swathes himself in his quilt and goes to sleep. In other respects no abnormalities in the position of the limbs can be confirmed, no atrophies nor paralyses, not even of the levatores palpebræ superiores. The movements of the eyeballs and of the mouth are quite normal, as are also the movements of the head and limbs, passive as well as active, when he assumes the dorsal position. There is no stiffness of the neck. When standing he soon commences to stagger. Romberg's symptom marked. There is an uncertainty in grasping articles, and when the eyes are closed. There is no actual disturbance of speech. Writing cannot be tested, as there is complete ignorance of the alphabet. He complains of headaches, which occasionally become more severe towards evening, also of giddiness. The sleep is profound and dreamless even in the day. Jamba, like all negroes, is hard to awaken. Tremor and tonic convulsions which are frequently observed in this disease, are not present, neither are there illusions or hallucinations; on the other hand, there is dementia and depression. Sensibility diminished over the entire body (in the initial stage it is frequently not yet decreased). The most delicate touches are not felt at all. Sensations of pain caused by pricks of a needle are readily recognised. The sense of temperature is The patient's intelligence seemingly diminished. being of a low type, no decided result of the proof of the sense of locality and muscular sense can be confirmed. Vision, hearing, smell and taste are seemingly not diminished, or at all events, not to any extent. The fundus oculi, on being examined with the ophthalmoscope, is found to be normal. Patellar reflexes are completely effaced. Abdominal reflex is not present, neither are tendo-achilles nor triceps reflexes. The

reflexes of the cornea and pituitary mucous membrane are maintained. The equally dilated medium-sized pupils react slightly to light and converge. The electrical excitability is found on trial with the faradic current to be diminished, as well as the gross motor

The lips and tongue are somewhat dry, the tongue slightly coated; it is protruded straight but somewhat tremulously; there is no malodorous saliva, such as has been graphically described in other cases. The appetite is good, thirst normal. Jamba at first received the usual food of the other patients, which consists mostly of rice, biscuit and salted meat, or fish, and fruit, such as bananas. There was no vomiting. The stools are soft and pappy, yellow, and contain ova of Ascaris lumbricoides, no anchylostomum duo-

denale, and are not particularly offensive.1

The abdomen presents no peculiarities, no sensitiveness to pressure such as has been observed in other The liver and spleen not enlarged. respiration is uniform. Nothing abnormal in the lungs, heart and the large vessels was apparent. Number of red blood corpuscles in 1 cbmm., 4,321,570. Number of white blood corpuscles in 1 cbmm., 23,500. There is thus some hyperleucocytosis. The eosinophile cells are double the normal. Very rarely there is fine basophile stippling of the red blood cells. In other respects the red blood corpuscles, in size, &c., appear normal. No malaria parasites. Hæmoglobin contents, with the Fleischl apparatus, 58. Embryos of filaria perstans in the blood; about one filaria embryo in about ten to twelve fields of vision. At the bacteriological examination of the blood taken from the cephalic vein, it was found completely sterile when examined on gelatine and agar-agar. Micturition voluntary and without pain. Quantity of urine in twenty-four hours, 2700. Specific gravity, 1009. Urine yellowish, clear, without albumen, sugar, or other constituents.

Jamba was at once submitted to an expectant treatment; lysol, ichthyol and chrysarobin have no effect on the dermatitis. On February 13th, santonin is tried for three days with castor oil. On February 18th the ascarides have disappeared. The physical condition is the same as usual. The temperature was never above 37°. The temperature mostly fluctuated between 36 and 36.3° C. The embryo of the filaria perstans remained unchanged night and day on repeated examinations. Methylene blue 1.0 in capsules, daily administered for ten days, had no effect on the filariæ.

Repeated examination of the blood exhibited the same condition, being always sterile in the bacteriological sense. Morphologically also, it remained unchanged. On February 13th inoculation of two small grey monkeys, two cats, one guinea-pig, and two fowls intramuscularly with 1½ ccm. defibrinated blood taken from Jamba's cephalic vein. The animals There was no development of remained healthy. embryo of the filaria perstans, such as has been assumed as a matter of course, on the grounds of earlier experiments. On February 20th and 28th, March 4th and 12th, the blood of these animals exhibited no peculiarities. On March 28th, the animals were killed. The blood, sterilised and streaked on agar-agar and gelatine, exhibited no bacterial growths. Incubators heated by petroleum were not attainable, but as a rule they do not act well. The temperature of the chamber where the tubes were kept fluctuated between 22-28° C. The organs of these animals exhibited no deviation from the normal. Of course care must be taken not to ascribe too much significance to such negative results from experiments on animals, an error into which Cagigal and Lepierre fell in their experiments when they affirmed that they had

obtained positive results and a new bacillus.

February 28, 1901.—Jamba becomes more and more sleepy, has to be awakened for meals, but eats with a good appetite. As soon as the last bit has been swallowed he is again asleep. When stood up he can no longer move forwards, or at most can only take a few wavering steps and then sink down power-In the meantime the external condition of nutrition remains good. The complaints of headaches, especially in the evenings, continue; muscular power is diminished, and also the electrical excitability. The replies have now become monosyllabic. The eyes are now only rarely opened for a short time. The mental obtuseness has also undoubtedly increased. During the last days the increasing sensitiveness to cold is remarkable. Jamba carefully wraps himself in several covers. In the meantime the temperature of the body has only once fallen in the evening to 35.8° C., otherwise it varies between 36-36.3°. Filariæ unchanged. They stain excellently according to my method of staining (Centralb. f. Bakt., &c., 1898, No. 25), or by means of hæmotoxylin. The remaining conditions also are unchanged. Number of red blood corpuscles, 3,980,720; number of white blood corpuscles, 22,300. The number of the eosinophile leucocytes average 1 of all the leucocytes. The red blood cells in other respects morphologically present no peculiarities. Hæmoglobin contents 54, according to Fleischl. Treatment with Fowler's solution, commencing with 8 drops, three times daily; internally, strychnine, 0.05, three times daily. At that time I knew nothing of the treatment with testicle extract.

March 1.—Jamba's fellow-countrymen came and averred they knew the disease well, and said that Jamba would now soon die. He must now return to his "country" in order to meet his family. Those who are acquainted with the difficulties of medical practice in Africa, know how jealously certain tribes watch that none of their relations are submitted to an autopsy, and can understand that Jamba, unfortunately, had to be discharged. On March 1st a photograph of the man was taken in front of the Government Hospital. On March 4th he was sent home on the Wörmann steamer. The condition of the skin disease unchanged. Later fate unknown.

#### EPICRISIS.

The picture of disease described above undoubtedly shows us a typical case of sleeping sickness of the negroes. Unfortunately, however, no contribution to the pathological anatomy of sleeping sickness can be

<sup>&</sup>lt;sup>1</sup> Mense, in the Arch. f. Schiffs und Tropenhygiene, 1900, p. 364, in an interesting article on sleeping sickness, describes sour masses of mucus with a fishy smell in the stools of one patient.

added. A meningo-encyphalitis has been known to be present a few times, once also an enlargement of the pituitary gland and changes of the medulla oblongata. Attention has also been called to the resemblance of sleeping sickness to Wernicke's acute "poliencephalitis superior." Meanwhile, the entire epidemiological and clinical condition constrains one to the opinion that it is a disease sui generis. According to the verbal statements of Dr. Richter, naval staff-surgeon, Dr. Larranga, in Loanda, observed no visible changes in the brain in autopsies. Let us now turn to the

#### ETIOLOGY.

The theories that the disease is originated by poisons surreptitiously administered, Indian hemp, mental disturbances, sunstroke, scrofula, &c., have been with justice dismissed as untenable and contradictory to the above-mentioned epidemiological fact. They are hypotheses unsupported by experience, advanced without practical knowledge of the conditions. The assertion that the uncivilised negro of West Africa becomes neurotic from emotion must be of rare occurrence in his child-like nature. In the civilised West Indian negroes, such a predisposition would be far more likely, on account of their intensely psychological life. Mental diseases certainly do occur in the negroes of West Africa. As an instance, I myself observed a case of acute religious mania in a black Presbyterian. Nevertheless, actual diseases of the nerves are very rare in West Africa.

The hypotheses as to sleeping sickness are, first of all: (1) Manson's theory, this authority being of opinion that filaria perstans, when localised in the cerebral vessels, is the cause of the disease. In Cameroon I have so frequently found filaria perstans in the blood of perfectly healthy negroes that it would be remarkable if the filariæ did not occasionally set up cerebral symptoms, provided the correctness of Manson's theory is assumed. In the meantime, sleeping sickness in Cameroon is quite unknown to the Duala. The embryos of filaria perstans in Cameroon, at least as regards the series of cases known to me, are to be regarded as harmless or fairly harmless blood-parasites, which cannot be made to propagate by the artificial inoculation of blood into other persons, and which therefore can only be transmitted by mosquitoes. I may here mention incidentally as an extraordinary fact that although I have examined the blood of several thousands of whites and blacks, I have never found filariæ in any but negroes. Dr. Low, who is Dr. Manson's pupil, and who was commissioned by the London School of Tropical Medicine to investigate the disease, told me personally in Trinidad, that he had frequently found filariæ in whites in the West Indies, a new proof as to differences existing in the separate tropical countries. Moreover, sleeping sickness has often also been found without the embryo of filaria perstans having been

According to this argument, filaria perstans should not be denoted as the cause of sleeping sickness, neither should the change of the pineal gland be thus regarded, as this condition has only once been found.

(2) Anchylostomum duodenale and rhabdonema strongyloides cannot come into the question as the

cause, for the simple reason that they have only been found in a fraction of the cases.

(3) Fränkel's diplococcus pneumoniæ, which Marchoux¹ endeavoured to bring into etiological connection with sleeping sickness, may be dismissed for the same reason.

(4) Cagigal and Lepierre's bacillus<sup>2</sup> may also be neglected for the same reason.

Then what is the cause ?

During my six months' investigatory journey in Italy I was able to study pellagra frequently and in its most various forms, the disease being very widely disseminated in many districts of Italy. This circumstance directed my investigations on sleeping sickness to other points of view. Pellagra is known to be a disease of intoxication, attributable to the continuous eating, for long periods, of rotten maize, causing extensive disturbances of the nervous system. It is advisable that before beginning the study of sleeping sickness that the investigator make himself acquainted with pellagra. I hardly believe that one of the authors who has hitherto written on sleeping sickness has had the opportunity of studying pellagra. It is, however, unconditionally necessary for the investigator to be in the position to make comparisons. It is also very desirable that a minute knowledge of lathyrism and atripticism-both of which are diseases of intoxication and lead to nervous disturbances—be acquired for the same object. Beri-beri will be, moreover, mentioned

Sleeping sickness is generally regarded as contagious by the negroes, the Wey-negroes—the constabulary-being likewise of this opinion. The saliva that drops from the mouth of the patient into the food-dish common to the family is especially considered infective. We shall see that there is a spark of truth in the observation of these children of Nature. It is not, however, the saliva of the sick that drips into the dish, that appears to be the cause, but the unsuitably prepared contents of the common dish. It is not a sine qua non that every one of those feeding should contract the disease. Even amongst those of the black races there are individuals with greater, and individuals with less, predisposition to a disease; so it is also in Italy. It is not every person eating bad maize that is attacked with pellagra. It appears that it is possible for the hereditary predisposition to be acquired. Of course accessory causes, such as bad food, hardships and excitement, combine in playing

There is no infectious disease, at least none the exciter of which is known, that is confined to a single race. Certainly some races are attacked more slightly and sooner than others. I am alluding to the particular predisposition of negroes to pneumonia. It is by no chance that the negroes of the West Indies, when attacked by leprosy, acquire the tubercular form in the multiplicity of cases, whereas the imported coolies

<sup>&#</sup>x27; Marchoux E.: Rôle du pneumocoque dans la pathologie et dans la pathogénie de la maladie du sommeil (Annal de l'Inst. Past., 1899, No. 3).

<sup>&</sup>lt;sup>2</sup> Cagigal, A. O., and Lepierre, C.: A doence do sommo e o sen bacillo (Coimbra medica, 1897, Nos. 30 and 31.) [According to Mense's reference, Archiv. f. Schiffs- u. Tropenhygiene, 1898, p. 110.]

of the East Indies acquire the anæsthetic form, as I was able to observe in Trinidad and Jamaica. Nevertheless,

no race is completely spared.

Why, however, does sleeping sickness attack the negro race exclusively, or almost exclusively? Within my knowledge there is no confirmatory evidence of Europeans being attacked by the disease. But even if, later on, a case of sickness of a European were proved, the explanation given by me would still hold good, for, unfortunately, there are some Europeans that live like negroes, or at all events often live with a negress. Even in mulattoes, who live somewhat better than negroes, the disease has only been observed in exceedingly rare cases.

Why, however, are children spared the disease up to two or three years old—this, according to my researches, being the case on the Congo as well as in the Wey-negroes—whereas, for instance, malaria is particularly apt to attack the children? This fact is interestingly elucidated by my mentioning that up to the age of two or even three years the negro children are suckled by their mothers. The tenderest age, i.e., age of suckling is also entirely or almost entirely free

from pellagra.

Why do entire tracts of land remain free from sleeping sickness whilst others become depopulated, whereas the same diseases, though varying in frequency and intensity are exhibited on the entire west coast of Africa in general? Cameroon, as mentioned, may be designated free from sleeping sickness as seemingly also may Togo, the Togo coast. In the Congo, however, according to Mense, affected regions and free ones are contiguous one to the other.

According to the report of the physician to the legation, Dr. Gleim, the disease in Angola is increasing and appearing in districts where it formerly did not exist. This *might* speak for an infectious disease,

but is not necessary, as we shall see below.

There are many districts of West Africa into which small modern migrations of peoples occur, when one tribe pushes into another like a wedge, imparts its customs to the other, and in turn receives new ones from the subjugated tribe. I need only remind the reader of the powerful onward march of the cannibalistic Fan tribe in the Congo district in a northwesterly direction towards the coast, in order to approach the white man to participate in commercial transactions and to break in upon the commercial monopoly of the people on the coast. I was able to observe this interesting comedy during my first stay in West Africa, 1894-95, in the south of Cameroon and in the French Congo. It is necessary to ascertain if these people, when on their wanderings, do not bring practical hints from their native land which their new neighbours have not yet learned to value. I may, moreover, mention that at the present time, West Africa, with all its treasures, being now opened up for agriculture, &c., hundreds and thousands of labourers of various tribes, far from their native land, are employed on the plantations, and that frequently a small tribal museum is formed in the midst of the surrounding black race.

In Africa, as a matter of fact, the conditions necessary to the spread of a disease, even a disease of intoxication, are not lacking. A few exceptions have already been mentioned, as, for instance, the apparent absence of leprosy on the coast of Cameroon, while, according to Mense, it is frequent on the Congo.

When, moreover, as has been stated, the disease only appears years after departure from the affected district, the fact must be taken into consideration that at first the happy-go-lucky negro does not notice the very first symptoms at all, and probably may have been suffering from the disease for some time without it having become noticeable. The negro by nature likes sleeping and sleeps much. The tropical practitioner who has to watch at night with negro attendants has reason to know this. Above all, however, the negro from the coast never or very rarely lives alone in another country on the African He always finds fellow-countrymen with whom he nearly always dwells and cooks, clinging to the customs of his native place. In nearly every spot, more or less, at least on the west coast, he will find the same articles of diet, though, of course, not the same conditions of life. The Duala in Cameroon have different and better foods than the imported labourers, usually blacks, from Upper Guinea.

I doubt very much if cases are known of negroes acquiring the disease several years after leaving their African home in thorough mental and bodily vigour, and living in European capitals in European style.

The above data constrain me to the opinion that sleeping sickness is a disease caused by chronic intoxication with a toxic material ingested with the food. The food in question must be a very common one, present everywhere that the negro is, or, at all events, everywhere where the disease exists. On going through the articles of food that may be regarded as occurring universally, dried salt water fish and manioc, or cassada, suggest themselves. Of these, however, dried salt water fish is consumed in places where there is no sleeping sickness. Two varieties of manioc are very common, Manihot Aipü (Pohl), which is poisonous in the raw state, but is eaten cooked, &c., and Manihot utillissima (Pohl), which is not poisonous. It is a fact that manioc is freely partaken of raw in those countries where sleeping sickness prevails. It is, moreover, well-known that the preparation of the poisonous manioc varies considerably in the different countries. It is clear that many stages may occur between the raw poisonous manioc and the same root rendered innocuous, corresponding to the various means of preparing it. I know, for instance, that the Duala only eat manioc cooked, i.e., roasted and after having soaked it for a long time.

By chance I have only lately read Dr. Gleim's exhaustive treatise, and I find that he apparently does not accept my manioc theory, as manioc has also been eaten previously in districts where sleeping sickness has not occurred at all. This question must, however, be solved by exhaustive studies on the spot, a method of investigation that Dr. Gleim himself urges, as the statements of negroes are unreliable. At all events, in Cameroon I have always adhered to my manioc theory, and always explained my reasons to medical men and laymen. Dr. Gleim mentions

Leprosy, which, according to Mense, is frequent on the Congo, does not, however, seem to occur on the littoral of Cameroon.

that a Portuguese doctor also told him that manioc root was the cause of the disease. Of course I do not know if that doctor had heard of my opinion, which I had already uttered in 1899, as I can prove, but knowledge travels quickly on the west coast of Africa. At all events, I maintain that I was the first to ventilate the theory extensively to a large circle. On this account also, my undertaking to proceed to Angola in May, 1900, by the recommendation of the Government, to study the disease was frustrated at the last moment. A systematic research into the mode of living of the inhabitants of the affected as well as of the non-affected districts is necessary for comparative purposes. The dissemination of Manihot utilissima and Aipii in the separate districts, and the manner of use and manner of preparation, should be investigated. The disease that, at the present time, depopulates entire districts of the Congo and Portuguese states may soon disappear by means of the general instruction of the population as to suitable preparation of the root, if, as I believe myself justified in assuming, the cause of the disease consists in the eating of raw or unsuitably prepared

The question should likewise be investigated as to whether the poison—be it manioc or not—be influenced in intensity by the climatic conditions of the year in question, the telluric influence of the district in question, so that in some years and in some localities the negroes fall ill and in some they do not. As far as I know, the solanin constituents of potatoes may vary. I remember having read an article by Pfuhl, in which the wholesale poisoning of soldiers through the solanin contained in potatoes is described. It may be objected that the European in Africa in out-of-the-way localities also eat manioc in place of potatoes that do not grow in the valleys of Africa. But the cook in the service of the European always serves up his master's vegetables cooked.

It is really surprising that the above train of thought has not been taken up before, and with enthusiasm.

A few incidents in my practice in Cameroon gave renewed opportunity for reopening the question of intoxication in the tropics. Thus, for instance, I succeeded in discovering a plant, ophivian low cissampeloider (Planch), Hook, which is used for purpose of poisoning in order to induce hamoglobinuria similarly to Morchella esculenta. This will be reported on later. On another occasion I was hurriedly called to a plantation where four negroes had died in the morning and five more were seriously ill. There was the fear, which was justified, that many others would be taken ill, and a few new invalids already showed symptoms of an outbreak of illness resembling ptomaine poisoning. The planter was at first inclined to believe that this was caused by poison administered out of revenge by the members of a certain other tribe. The planter had caused two tribes to change their dwellings, and one tribe was very unwilling to quit its old quarters.

A thorough investigation instituted at once led to the conclusion that the disease had undoubtedly been caused by the drinking of water from a water butt, in which the remarkably stupid cook of the patients had allowed a few rotten pieces of papaya and another unknown fruit to float in for several days. The most thorough evacuation of the stomach and bowels led to the speedy cure of the sick. However, a few stated that for more than a week after they suffered from headache and weakness in the limbs. This short experience has no direct bearing on the subject under discussion, but it shows in which direction in the way of conclusions per exclusionem the researches on sleeping sickness should be conducted. The search for new bacilli must, however, always occupy attention in the reasonable investigation of epidemiological facts.

In this manner, men like Robert Koch, Manson and Ross, Laveran, Bignami, King, &c., formed their conclusions in regard to the modern knowledge of malaria, and were able to prove their point by experimental results in animal and human malaria, conducted partly by them and partly by Grassi and others. Whether my assertion that sleeping sickness is really a disease of intoxication in the same sense as pellagra be justified or not, whether my hypothesis that the ingestion of maniol unsuitably prepared causes the disease, be confirmed or not, I consider I am justified in making the following assertion: In the blood of persons suffering from sleeping sickness there is no exciter of disease that can be cultured by the usual methods so as to be made to develop further.

Other occupations have hitherto retarded the above communication. The journey now again taken to West Africa, will, it is to be hoped, furnish fresh material. Even if the author of this article is on the wrong track, he hopes by means of it to assist in directing renewed attention to the epidemiology of this highly interesting disease. (Centralblatt f. Bakteriologie, Parasitenkunde u. Infektionskrankheiten.)

MALARIAL ORIGIN OF ZOSTER.—James MacFarlane Winfield, who in 1895 gave the results of examinations of the blood in eight zoster patients, showing that about 50 per cent. in them were suffering from malarial infection, now reports twenty-five additional cases, all of which had symptoms suggestive of infection, and fourteen of which gave positive evidences of paludism as proved by the presence of the malarial parasite in the blood. The author states that while it is not his intention to assert that this special organism is the only causative agent in the production of this neurocutaneous disorder, zoster (for it is undoubtedly that many different varieties of bacterial intoxication could bring about the same effect), he maintains that the plasmodium malariæ should be considered one of the causes in a disease that is so etiologically uncertain.—The New York Medical Journal, August 2nd, 1902.

This statement may also be applied to beri-beri, as observed in Cameroon. The aspect of the disease called beri-beri by me in Cameroon is similar to that described by Scheube and others, but is apparently much milder, at least in the cases observed by me.

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THE

## Journal of Tropical Medicine

OCTOBER 15, 1902.

#### MEDICAL OFFICERS IN BRITISH PROTECTORATES.

WE are from time to time made aware of the fact that for our Protectorates medical officers are engaged and despatched thither by the Foreign Office. We are unfortunately reminded of the fact by virtue of complaints as to pay, leave, rank and pension sent to medical papers by these officers; and it behoves us to enquire into, and to assist as far as it is possible, the conditions under which they serve. authorities is not the right way for any public officer to remedy an evil; but there are many methods of bringing to light a grievance which are quite consistent with loyal service. Grumbling is again a style of remedy which is not likely to be attended by the best results; yet it behoves every medical man to state what, after practical experience, appear to be the radical defects in a service to which he may happen to belong. It is

usually argued that every man, when appointed, knew the circumstances under which he took up service, and that he has no right to make complaint. Were this principle followed to the letter, we would never hope to see any improvement in our public services. Our Protectorates are at best but tentative in their attempts at Government, and with the development of a new country there must arise modifications in every branch of the public service engaged in administering the affairs of the protected country. In this spirit, therefore, we are willing to deal with the matter, and we are ready to receive and to publish articles concerning the best method of medical administration adapted to our Protectorates. Foreign Office, we are sure, will willingly modify the present régime, if such seems faulty, and were a scheme of entrance and promotion drawn up by officers of experience, there can be no doubt the public service would benefit, and an efficient medical service would be the result.

#### DISINFECTION BY THE CLAYTON GAS. A MIXTURE OF SO2 AND SO3.

WE have from time to time reported upon the nature and results of this form of disinfection, and we await with interest the publication of careful experiments which have just been made by Professor Calmette in France. As yet we have the barest outline of these experiments, but they are so important and convincing that it may be well to give a short account of them. The principle of the Clayton method of disinfection is simplicity itself. Take, for example, a ship in which plague has occurred. As soon as the vessel is berthed a barge with the apparatus is towed alongside, and without disturbing the cargo the inlet and outlet pipes are introduced, the former reaching to the lowest part of the hold, and the upper just within the upper part of the deck or decks to be disinfected. The gas, a mixture of SO2 and SO3, is generated by the apparatus and conducted by the inlet pipe to the lower part of the hold. Its spread through the vessel is encouraged by the suction of the outlet pipe, and after a period varying from an hour or two to several or many hours, according to the bulk of the cargo,



disinfection is complete. Rats, mice and vermin generally are destroyed, and the cargo is undamaged by the exposure. Germs of infectious diseases are held to be destroyed; but it was not until Calmette subjected the whole process to thorough investigation that a scientific basis for this belief could be said to exist.

Professor Calmette's proceedings were as follows:

"During the last week of September, 1902, Calmette came down from Lille, bringing with him fresh cultures of the plague, cholera and typhoid fever, arranged in the following manner: Strips of flannel were soaked in the cultures; these were placed in tubes about 30 millimetres in diameter, open at both ends, and stopped with cotton as usual; a set of dry and a set of moist cultures in each lot of tubes. Other similar strips were wrapped in two thicknesses of blotting paper, then in a piece of flannel, and round all a doubled piece of what seemed to me to be thick oiled paper—double papier écolier gommé they called it—this making a separate sachet or package for each kind of microbe—one set moist, another set dry.

"A series of each, in tubes and in sachets, was placed in the lower hold of the vessel we were fumigating, and another series in the upper 'tween decks, close to the open 'tween deck hatch, the holds being empty. The deck hatch was only partially closed, as one of our pipes led through it.

"Dry and moist test tubes and sachets were kept for each series; these remained on deck out of reach of the gas.

"At 10.55 a.m. they started the generator, the discharge pipe running to the bottom of the hold through one of the ventilators, the aspiration pipe drawing the air from the hatch. At 11.55 a.m. the gas was found to be 7 per cent. as it came from the generator. At 12.10 it was 8 per cent. from generator; 12.30, 10 per cent. from generator; 12.40, 11 per cent. from generator; 12.55, 14½ per cent. from generator; and 1 p.m., 15 per cent. from generator.

"The atmosphere in the square of the hatch at this hour showed only 5 per cent. of gas, but the generator was stopped at 1.10 p.m., two hours and a quarter from the commencement of the work, the space filled being about 70,000 cubic feet. There was a great deal of leakage through the bulkhead into the adjoining compartment in the ship; and it takes, as you

will see, about an hour for the generator to get properly heated up to produce a fair gas. We could have gone on indefinitely at 15 per cent. after reaching that figure.

"Two hours later, at 3.10 p.m., the hold was opened up, and a score of rats were seen lying about; twenty-seven in all were found. At 5 o'clock, without any artificial ventilation, Dr. Calmette's assistant went into the hold and got out the cultures.

"Another operation was carried out in a deck cabin, where a wet and dry set each of tubes and sachets was placed in the upper and lower bunks. Those in the upper bunk were wrapped up in a doubled woollen blanket and a pillow laid on top of them, with the mattress below. The discharge pipe was pushed in through a port, but no pains were taken to make the place air-tight, and a 4-inch scupper for draining the floor of the cabin was left open.

"At 1.33 p.m. we started the generator, which was still partly hot, and at 1.40 p.m. it was producing a 5 per cent. gas. At 1.58 we had a 10 per cent. from the generator and an 8 per cent. gas in the cabin, when we shut the generator down, leaving the cabin closed.

"At 4.10 the atmosphere in the cabin was tested, and only  $1\frac{1}{2}$  per cent. gas was found at the level of the lower berth—thanks to the open scupper I fancy—while  $2\frac{1}{2}$  per cent. was found on the upper berth. At 4.15 the door was opened and the cultures taken out; altogether they were in the cabin about two hours and three-quarters.

"Dr. Calmette took all the cultures back to Lille with him that evening, and next morning, September 28th, he placed all his strips—those that had been in the gas and those that had not—in meal bouillon and peptonised water. These cultures were placed in a stove at a temperature of 37° C., and examined in twenty-four hours, three days, and seven days.

"The following table shows the results—0 indicating that the tube cultures remained sterile after seven days in the stove, x indicating that microbes developed.

			Pl	ague.	Ch	olera.	Typ	hoid.
			Dry.	Moist.	Dry.	Moist.	Dry.	Moist.
A.	(lower hold)	Tubes	- 0	0	 0	0	 0	0
		Sachets	0	0	 0	0	 0	0
B.	('tween decks)	Tubes	0	0	 0	0	 0	0
		Sachets	0	0	 0	0	 ×	0
C.	(deck cabin)	Tubes	0	0	 0	0	 0	0
		Sachets	0	0	 0	0	 0	0
D.	Tests	Tubes	×	×	 0	×	 ×	×

"So that all the tubes with the strips that had been subjected to the Clayton Gas remained sterile except the one that had the dry strip in the sachet placed in the 'tween decks near the hatch.

"All the test cultures that had not been in the gas, except the dry cholera strip, multiplied and flourished abundantly after twenty-four hours in the stove. Dr. Calmette says the cholera microbe in a dry state is very fragile.

"I may tell you that he was very much surprised at the results obtained, and to a great extent so was I. The cultures in the bottom of the hold I expected to see destroyed, but those in the 'tween decks and in the cabin I did not think had been long enough in the gas. Had the operation been prolonged in the hold and 'tween decks for another half-hour, the dry typhoid culture in the sachet would doubtless have been destroyed, as it took longer to develop than the test cultures, and must have suffered to some extent.

"Dr. Calmette has sent an official report to the Minister of the Interior, a copy of which will be published in the Revue d'Hygiene et Police Sanitaire. His conclusions are that the gas produced by the apparatus used as is practised in fumigating ships, and of a percentage of 8 per cent., is perfectly efficient for the sterilisation of material tainted by the microbes of plague, cholera and typhoid fever. This process assures the destruction of all rats and insects without damage to goods or vessels, and it ought to be generally adopted for the preservation of the health of crews and passengers.

"All the quarantine stations in France, he says, should be provided with the apparatus as soon as possible, so as to diminish the present long delays in quarantine, and to safeguard the ports against an invasion of plague and cholera, always possible, and at the present moment very threatening.

"He is continuing his experiments on other cultures, and thinks that the gas will prove fatal to the tuberculosis germs."—Extract from a Letter to the Editor.

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#### British Medical Association.

#### FILARIASIS IN SIERRA LEONE.

By W. T. Prout, M.B., Ch.M.Edin.

Principal Medical Officer, Sierra Leone.

(With Plate).

The following notes contain the results of a series of observations on the prevalence and varieties of filaria in Sierra Leone, a subject which, so far as I know, has not hitherto been worked at; and, indeed, with the work on filaria by Dr. Annett and others, published by the Liverpool School of Tropical Medicine, little attention has been paid to this on the West Coast of Africa. My observations tend to show that filariasis is an extremely prevalent condition on the West Coast of Africa, much more so than has hitherto been suspected, and it is not improbable that some of the more obscure diseases with which we have to deal among natives may be connected with this fact.

The principal source from which I obtained preparations of blood was the Colonial Hospital at Freetown, where natives from all parts of the country are admitted, and I was also furnished with a number of slides from the Protectorate through the kindness of some of the district surgeons. In those cases examined at the Colonial Hospital the subjects were suffering from some disease or other, but in the majority of cases from the Protectorate the specimens were from apparently healthy individuals, selected at random from the general community or from members of the Frontier Force stationed in the district. The procedure was in most cases as follows. A thick film of blood was taken in the early part of the day, between 10 and 12 o'clock, and again at night between the same hours. I have not considered it necessary to indicate the number of filaria found in each specimen, as the films varied in size, and so long as the periodicity is ascertained, the actual number of filaria is unimportant, the fact of infection and its nature being the essential features.

I have examined some hundreds of specimens of blood, and of these definite records of 275 have been preserved. In 266 of these, both day and night blood were examined, and in 9 night only. Out of the 266, 57 were found to contain filaria of different kinds, and of the 9, two specimens contained filaria: a total of 57 cases, or 21.4 per cent. of the whole. But an analysis of the figures brings out some interesting results. At Bandajuma, in the Protectorate, 35 per cent. were found to be infected, at Moyamba 38.7

per cent., at Sherbro 22.5 per cent., and at the Colonial Hospital 16.3 per cent. This is brought out in the following table:-

TABLE I.

		ined	File	ria found		Per	
		No. Examined	Day Blood	Night Blood	Both	Total	Cent.
Bandajuma		20	_	6	1	7	35.0
Moyamba		31	-	10	2	12	38.7
Sherbro		22	_	4	1	5	22.5
Colonial Hospi	tal	202	4	22	9	35	17.3
Total		275	4	42	13	59	21.4

It is quite clear, therefore, that filariasis is much more prevalent in the Protectorate than among the cases examined in Freetown. A study of the latter brings out this fact still further. As far as possible I have ascertained the residence of these cases and the length of time they have been in Freetown; 108 were found to have been permanently resident in the city, or had been for lengthened periods. Among these only 6.5 per cent. were found infected, while among those coming from the Protectorate and the outlying districts of the Colony proper no less than 26.1 and 30.3 per cent. were infected.

Table II.—Distribution of Filaria among Cases from Colonial Hospital according to Place of Residence.

			No. Examined	Filaria Found	Per cent.
Freetown			 108	7	6.5
Protectorate			 65	17	26.1
Distribution of Co	olony	proper	 24	8	30.3
Foreign			 5	3	60.0
Total			 202	35	17.3

It is evident, then, that Freetown itself enjoys a comparative immunity from infection, but what the probable explanation of this is I am not yet prepared There is a large aboriginal population in the city, and a constant stream of natives coming from and going to the Protectorate, a large proportion of whom must be infected, and it would seem likely that the townspeople would get infected from this source. Possibly one reason may be the distribution of the people in the town, the aboriginals living, as a rule, in one quarter, while the natives of Freetown live in another, but this is by no means a hard-and-fast rule; or perhaps the variety and distribution of the mosquitoes in the city have a good deal to do with it. This point I have not yet been able to work out. The fact is a very interesting one, that we have a community composed almost entirely of negroes, one class of which, so far as my figures go, are comparatively free from filarial infection, while the others suffer to such a large extent.

The following table shows the varieties of filaria met

TABLE III.										
		No. Examined	Filaria Nocturna	Filaria Diurna	Filaria Perstans	Filaria ?	Pilaria Nocturna & Perstans	Filaria Nosturna & Oigas		
Bandajuma .		20	6	-	_	-	14.07 T.L	-		
Moyamba .		31	11	1-	-	-		1		
Sherbro .		22	5	-	-	-	18275	XIII		
Freetown .		202	28	2	2	2	11	RE-100		
Total .		275	49	2	2	2	1	1		

(1) It will be seen that, as is generally the case elsewhere, filaria nocturna predominates. In the majority of instances where filaria were met with both day and night, those in the daytime were few in number, and were evidently stray nocturna. In one case there was a double infection of nocturna and perstans, and in another nocturna and a new filaria.

(2) Filaria diurna was found in two cases, with physical characteristics much the same as nocturna. I am inclined to believe, however, from measurements of stained specimens (though I am aware this is apt to vary), that filaria diurna is a slightly smaller worm than nocturna, and that the tail does not taper so sharply.

(3) Filaria perstans occurred in three cases.(4) In two cases I found a minute filaria measuring 0.112 millimetres in length by 2 to 3 µ in breadth, or less than half the size of filaria nocturna. It has a rounded head and a truncated tail. There is a clear linear band about one-fourth of the length from the head, a clear spot a little further down, another irregular clear spot about two-thirds of the distance, and a linear mark near the tail. I am unable to identify this worm, but it appears to me to resemble very nearly the worm which has been described by Dr. Manson as filaria Ozzardi. It has been suggested to me that it is a perstans very much shrunk. Although I know that perstans is apt to vary in size, yet the difference in size seems to be more than can be accounted for in this way, and in those cases where it was found all the filaria were the same size. I am inclined to regard it as a different species.

(5) In one specimen I came across a worm which, so far as I know, has not hitherto been described. The most striking characteristic is its great length and thickness, 0.34 mm. by 8 to 12 µ. It stains very readily with fuchsin, and retains the stain with great tenacity, so much so that I was unable to decolourise it with glacial acetic acid without spoiling the specimen. The structure is consequently obscured. There were two specimens in the blood film (which also contained nocturna), one much larger than the other, the small measuring 22 mm. by 8 to 10  $\mu$ . The head is rounded, there is a taper to the tail, which is blunt, and no sheath could be made out. On careful focussing, evidence of a central canal could be made out, but beyond this description I am unable to go at present. Of course I am not in a position to say what the pathological significance of such a large worm in the blood is. It occurred in a private of the Frontier Force, apparently in good health, so far as I have been able to ascertain, and I hope to obtain further specimens of his blood. In the meantime I place it on

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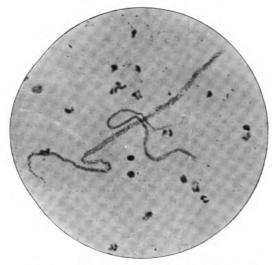


Fig. 1.--Filaria Nocturna and Filaria Perstans (double infection).

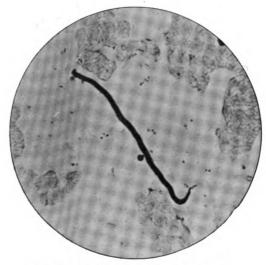


Fig. 2.—Filaria Diurna, showing sheath.



Fig. 3. - Filaria (?).



Fig. 5. Filaria Gigas.



Fig. 4.—Filaria Gigas.



Fig. 6. Filaria Volvulus.

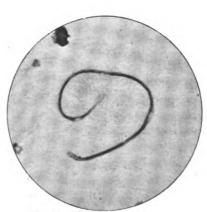


Fig. 7.—Filaria Loa.

TO ILLUSTRATE PAPER ON FILARIASIS IN SIERRA LEONE,

By W. B. PROUT, M.B., Ch.M.Edin.

Bale, Sons & Danielsson, Ltd.

(From Micro-photographs,  $\times$  330.)

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record, and suggest, provisionally, the name of "filaria

gigas."

(6) Filaria volvulus.—I have already described the adult male, female, and embryos of this worm. They measure 25 mm. in length by  $5 \mu$  in breadth, have a marked clear spot, a central granular aggregation, a

pointed tail, and no sheath.

(7) Filaria loa.—This was a very interesting case. The patient, a European under the care of Dr. Renner, to whose kindness I am indebted for the opportunity of seeing the case, had had two adult worms removed, one from the loose skin of the penis and the other from the eyelid. He had been resident at Sherbro for about a year, but some time previously had been living on the Congo. On examining the blood it was found to be swarming with an embryo which is presumably that of filaria loa. It was about 3 mm. in length and 3 to 4 µ in breadth. It has a taper to the tail, which is pointed, but I should say not so sharply as that of filaria nocturna. There are four clear spots, but the swellings along the course of the worm I am inclined to attribute to changes during preparation. I have not myself seen a case of filaria loa previous to this in Sierra Leone, and it is probable that it was

acquired while in the Congo.

Filarial diseases.—The prevalence of diseases which are actually filarial in origin is difficult to arrive at. The following table shows the different diseases from which patients in the Colonial Hospital, in whose blood

filaria were found, were suffering:-

TABLE IV.

Disease	Nocturns	Diurna	Perstans	Filaria (?)	Nocturna and Perstans	Nocturna and Gigas
Injuries	3		_		-	
Ulcer	6	_	- - 1	-	=	
Necrosis	1	- - - - 1		-	_	-
Bronchitis	1	_	-	-	_	
Diarrhœa	1	-	1	-	_	_
Melancholia	1	_	_	-	-	-
Conjunctivitis	-	-	-	-	_	
Fibroma	1	1	1	-	-	
Debility	4		_	_	-	
Syphilis	1		_	_	-	-
Rheumatism	3		-	-	1	-
Fracture	1	-	-	_	1 7 1	
Peripheral neuritis	1	-			-	_
Peritonitis	_		1 1 1 1	- - - - - - - - 1		1111111
Stricture	1	_	_	-	_	_
Lipomata	-	-	-	1	_	-
Diseases not recorded	3	-	_	_		

It will be seen that the most common diseases were ulcer, debility and rheumatism. I consider it not improbable that the vague aches and pains which are classed as rheumatism, and which are so common in Sierra Leone, may be associated with the presence of filaria in the blood, and that the ulcers which reach such a large size in natives may have some relation to obstruction of the lymphatics.

Chyluria has been noted, but is rare. Lymph scrotum is also rare. Enlarged lymph glands, especially in the groin, are very common. Elephantiasis cannot be said to be a common disease. In 1,210 cases admitted to

the Colonial Hospital in 1900 there were no cases of elephantiasis; in 1901, out of 1,265 there were two cases of elephantiasis of scrotum and two of the leg. In the Protectorate, where, as I have shown, filaria nocturna is very prevalent, elephantiasis does not appear to be common. In the absence of exact information as to the population, it is difficult to get a definite idea as to the percentage, but one of the district medical officers, who has now had a large experience, considers that 5 per 10,000 is an outside estimate, while others agree that it is by no means common.

The question of the relationship of elephantiasis to the presence of filaria nocturna in the blood appears to me to rest on a very slender and almost entirely theoretical basis. One of the principal arguments is that the distribution of nocturna and elephantiasis coincide, and that the one increases in the same ratio as the other. I venture to think that the present instance is one which militates strongly against this argument, for if the presence of filaria nocturna is the cause of elephantiasis, we should naturally expect that where the percentage of infection is so high the prevalence of elephantiasis would be greater than it is; and I am inclined to believe that as the geographical distribution of nocturna is more worked out it will be found that it is more extensive than is supposed.

Space forbids me to deal with the other arguments which are adduced in favour of this theory; but though I do not go so far as to take up the position that elephantiasis may not be due to nocturna, it seems to me that the almost universal acceptance of this preconceived and unproved theory has had the unfortunate result of putting a stop to investigations along other lines.

# THE CAUSE OF BERI-BERI. By Captain E. R. Rost, I.M.S.

Having worked at the pathology of this disease since 1898, and having conducted a large number of experiments, already published in the *Indian Medical Gazette* for December, 1900, July, 1901, and July, 1902, I am anxious to bring the matter up for discussion, hoping that someone may verify the experiments.

An outbreak of beri-beri occurred at Meiktila Jail in 1898, during which I observed that pigeons (which lived in large numbers under the roofs of the Jail buildings) were affected by an epidemic disease, which caused paralysis of the wings and death. At this time I thought I had traced the disease to a micrococcus which I found in the jewari, the staple food of the Jail. Between the tiles of the roofs and the boards, accumulations of pigeons' excreta of years' duration was found and cleared out, wire-netting being put up to prevent the pigeons again nesting. After the pigeons had been thus circumvented the epidemic died out. The jewari was stocked yearly in the granary and the lower layers were found mouldy and were condemned.

Later, in coming to Rangoon, I had the opportunity of studying this disease and was brought by my former experiences and a study of the etiology of the disease in Rangoon, to search for the causation in rice. I found in rice-water liquor and in mouldy rice an

British Medical Journal, January 26th, 1901, p. 209.

angular diplo-bacillus between the starch granules, and found that this was extremely resistant to high temperatures, a temperature of 220° F. for nine hours being necessary to kill off the spores of the diplobacillus. I found this organism in the blood and cerebrospinal fluid of a large number of beri-beri cases; the blood was removed by the pippette method and cultivated in broth, rice-broth and ascitic fluid. It was a sporulating angular diplo-bacillus which would thus appear in all varieties of shapes, it was very mobile, easily stained by carbo-fuchsine, and about the size of the tubercle bacillus. I then commenced injection experiments from cultures of this organism into fowls. They died with symptoms to be hereafter described and the bacillus was found in their blood and spinal cords.

I have now carried out a very large number of experiments on fowls and latterly on pigeons, and will mention these in detail, as they are most convincing in showing the connection between a disease in rice and beri-beri in man. An exactly similar disease was

produced in fowls :-

(i.) By feeding them on fermenting rice obtained from the rice-liquor shops.

(ii.) By feeding them on mouldy rice obtained from

the lower bags of damp godowns. (iii.) By intraperitoneal injection of rice-water

(iv.) By subcutaneous or intraperitoneal injection

of the venous blood of beri-beri patients. (v.) By reinjection from fowls suffering from the

disease produced as above.

(1) Fowls fed on fermenting rice obtained from pegu jars in the rice-liquor shops of the town develop a disease which is rapidly fatal. Out of thirty fowls experimented upon in this direction not one recovered, although three removed from the influence of the feeding died shortly after. The symptoms came on gradually with loss of feathers, anæmia, diarrhœa, weakness, listlessness, and great loss of weight. The feathers commenced to fall out on the neck and extended to the trunk, the cockscombs became blue. There was some suspicion of ataxia, as some would fall over on being chased. They fed well of the rice until the final stage of paralysis occurred. The time at which the fatal termination would come on was very variable, and appeared to depend on the weight of the bird. At the paralytic stage they stood in crouched-up positions supporting themselves on their backs and tails, with their feet in the air, their wings spread out to balance themselves. On being thrown up they fell like dead weights. They became paralytic and ataxic, and later cyanosed, and gasped for breath. Some died very rapidly, others took about two days to die in this condition.

In some the diarrhœa was severe, and in some cases there were bloody, slimy evacuations. mortem appearances showed hyperæmia and thickening of the gastro-intestinal tract, in some cases marked petechiæ in the small intestines (Professor A. Holst in a large number of autopsies performed by him in Rangoon on beri-beri cases found thickening and petechiæ in the small intestine, though this was also

found in cases of diarrhoea and dysentery).

Latterly, three fowls were injected subcutaneously from the heart-blood of three fowls dead of the disease by feeding on fermenting rice; these birds all died with the same symptoms: there was less loss of feathers, but the same great anemia, loss of weight, and finally the paralytic stage. To contrast this condition with similar remove experiments carried out from fowls dead of the disease after the injection from beri-beri blood (suggested to me by Professor Holst), made it quite impossible to doubt that the two conditions were but one and the same disease.

(2) In very much the same way, fowls fed on mouldy rice, from which the fermenting rice above referred to is prepared, suffer from the symptoms above described, the diarrhœa is less severe and course of the disease more prolonged, but the fatal

termination the same.

(3) Three fowls were injected intraperitoneally with rice-water liquor, and died about two months later, after diarrhœa, loss of feathers, great anæmia, the fatal termination being the same as in the other cases.

(4) Twenty-four fowls were injected intraperitoneally from the venous blood of beri-beri patients; all died with the same symptoms except two, in which

the disease did not develop.

The blood was removed from the median cephalic vein by insertion of a sterile glass pipette directly into the vein, sealing the ends, breaking off the ends, and inserting the pipette into the abdomen of the fowl direct, the blood from the pipette running into the abdomen cavity.

These birds showed symptoms which came on gradually: diarrhœa, anæmia, loss of feathers, weakness, drooping of the wings. They fell rapidly in

weight, but partook of their food well.

The acute symptoms would suddenly come on and the bird die with symptoms identical as in the fermenting rice series.

Post mortem showed hyperæmia and petechiæ in the small intestine (this was only looked for in the later

repetition of the experiments).

Several control fowls injected with blood of other diseases did not develop the disease. Professor Axel Holst was at this time experimenting on the subject of beri-beri in Rangoon, and at his instigation we tried the effect of injecting a small amount of blood from a fowl dead of the disease into three healthy fowls. These were injected subcutaneously with a broth emulsion of a small amount of the blood of a fowl dead of the disease. These three fowls died of the disease, and from the blood of these other fowls were injected subcutaneously. The same symptoms appeared in these, a third and a fourth series being injected, all dying with the symptoms already described.

Latterly the same experiments with pigeons were Six pigeons injected intraperitoneally with the blood of beri-beri patients developed symptoms which came on suddenly from one week to three weeks after the injection. They fell in weight, had diarrhoa, anæmia, could not fly or stand, became cyanosed and gasped for breath, and died. Post mortem: hyperæmia and petechiæ were found in the small intestines. Reinjection has produced the same symptoms in

another pigeon now under observation.

The later experiments of reinjection show that the disease must be caused by a micro-organism in the blood; that fowls fed on diseased rice die from a

disease due to a micro-organism in the blood, which, on reinjection, produces the same disease. That the birds injected from the blood of beri-beri patients die from a disease due to a micro-organism in the blood, which, on reinjection, produces the same disease. From the identity of the symptoms of the disease produced in these two ways, and the identity of the symptoms of reinjection in both instances, one can have little doubt that the two conditions are caused by the same micro-organism.

I will now draw your attention to the etiology of the disease in Rangoon, which in itself is so remarkably in favour of the rice origin, as to leave little doubt

as to the causation of this disease.

An analysis of 390 cases treated as in-patients in the General Hospital, Rangoon, in 1901, show that 342 were Hindus, 364 were males, 338 were coolies. The usual age was between twenty and forty years. No case in a child has been known, and cases in women are comparatively rare. Captain Barry, I.M.S., in the Indian Medical Gazette for September, 1900, has gone into this matter thoroughly, and shows how the cases increase with immigration of the Hindu coolie.

The Hindu coolie is the man who is chiefly addicted to rice-liquor drinking; he is very fond of it, and can obtain a quart for one pie. They are not the only people, however, who drink it, Madras Sepoys, even British troops, Eurasians, and sometimes women.

In Lower Burma there are special shops where this liquor is exclusively prepared and sold. I have been to several of these shops, seen the liquor made and the class of man drinking. It is prepared from bad rice bought at a cheap rate from paddy brokers, who in bringing paddy to the mills in the Poozondanug Creek, get their boat loads occasionally damaged by water; the mill-owners refuse this, and the paddy broker sells off at a cheap rate. This bad rice is made worse by storing in damp godowns.

The rice-liquor is made by allowing this damp rice to ferment in pegu-jars, which are never cleaned out, the water merely being poured off into bottles, which are sold across the counter. The longer the stuff is allowed to remain in the bottles the better it is

appreciated. It tastes like cider.

The chemical analyst's report on this liquor shows that it contains phosphoric acid and sodium chloride in small quantities, acetic acid, and alcohol (7 per cent. absolute alcohol by weight).

No authentic case is on record in this hospital in which a man is said to have contracted the disease in hospital, some have contracted the disease in hospital, but these have been in the habit of going out to the bazaar or have not been long in hospital. The coolie classes in Rangoon live together in an extremely crowded state, yet no cases have been found in children and rarely in women. No particular area or group of houses has been known to be affected, and it has never appeared as an epidemic here.

With regard to the symptoms, in going through the cases of 1901, I find that out of 390, 202 had a rise of temperature or diarrhœa, 90 had both a rise of temperature and diarrhœa. In 119 cases the diarrhœa was severe and lasted throughout the illness. The rise of temperature was irregular and not thought to

be of malarial origin. Moreover, blood examinations in the cases did not reveal the plasmodium.

I mention these two symptoms, recalling the postmortem appearance of the intestine of beri-beri cases and of beri-beri fowls, as showing that the primary focus of infection is in the intestine. There are some instances of outbreaks of this disease in lightships, in schools, and in countries where it would appear difficult to look for the causation of the disease in rice-liquor or in diseased rice. But it is probable that rice is not the only cereal in which this disease can grow; moreover, it is possible that the disease may be, in some instances, communicated by means of fowls suffering from the disease. This reminds me that I have seen fowls suffer from a disease accompanied by loss of feathers and diarrhoa and I am told that fowls do suffer from epidemics of diarrhœa and loss of feathers, that the disease lasts some weeks, and is, therefore, unlike fowl cholera.

#### THE PROPHYLAXIS OF SUNSTROKE.

By Andrew Duncan, M.D., B.S., F.R.C.S., M.R.C.P. Physician, Seamen's Hospital Society and Westminster General Infirmary.

HAVING unfortunately during my career in India suffered on four occasions from the effects of the sun, I venture to detail a method of preventive treatment which answered admirably in my case. I will first sketch briefly the clinical symptoms of my attacks. In August, 1880, I had returned to India in the rudest health after six months' sick leave to New Zealand from Cabul. I was sent up on service again immediately, but this time on the Candahar line. I reached Sibi in the first week of September. What the temperature must be at this place in July is rightly estimated by the saying of the natives of this part of the country, when they wonder why the Supreme Being made hell when Sibi was at hand on the earth. In September, 1880, the train came abruptly to a stand on a hot, dusty plain, no railway station being as yet built. In walking over to the dak bungalow, even at this time of the year, the heat was terrific. The same week I joined my regiment in the Pishin Valley, and the next day we took part in a small expedition against some recalcitrant village. On returning to camp my head was splitting, and I had to be sent at once to the hospital. During the next twenty-four hours the pain continued to increase, accompanied by great intolerance to light, and I was fast lapsing into unconsciousness, when, fortunately for me, my friend, Surgeon Armstrong, saw me, had my head shaved and blistered, and practically saved my life. For the next six weeks, however, the racking pain in the head never left me, except at the end of this time, in the evening hours. I then was invalided to England, but it was not until I got west of Suez that the headaches ceased. After two years' sick leave I returned to India, and was stationed at Mian Mir. About March, as the hot weather commenced, I was again seized with these distressing headaches, and in the first week of this second onset a temporary attack of hemiplegia

occurred. I was invalided to Kashmir for five months. During the first four months of my sick leave I scarcely remained for a day free from intense pain in the head. After four months the pains gradually ceased, and I returned to duty. Each succeeding hot weather for a series of years severe headaches now regularly tormented me, but no definite attack of sunstroke occurred until 1887, when I was again the victim of this affection whilst on leave shooting in the Himilayas. Lastly, in April, 1891, whilst on the Black Mountain expedition, my last attack occurred, characterised by the same distressing symptoms—namely, an intolerable headache, &c. For this I had five months' sick leave to the hills, but, on returning to duty in the plains I was again knocked over by the sun, and had to take two years' leave to England. Shortly after my return to duty, I fortunately read a letter in the Pioneer newspaper, written by an executive engineer. This officer had suffered on several occasions from sunstroke. Reasoning from the fact that no one gets heat-stroke from the great heat of furnaces in an arsenal, he came to the conclusion that the heat rays of the sun were not the fons et origo mali, but the actinic rays. Hence he treated his body like a photographer treats his plates, and enveloped it in orange, using always an orange-yellow shirt, and lining his coat and hat with flannel of the same colour. During the subsequent five years of extreme exposure he suffered from no bad effects of the sun. Acting on this hint, whenever I had to perform a march in the hot weather I always used an orangeyellow shirt; I lined my helmet with orange-yellow flannel, and had a pad of the same colour stitched into my khaki coat down the back. I, too, never again, in consequence, felt the effects of the sun. I would, therefore, submit that the dangerous rays of the sun are the actinic, and as a means of protection from sunstroke I would advocate the use of such means as I have indicated. As a further precaution the helmet might be lined with a layer of tinfoil.

### Rews and Notes.

THE QUARANTINE STATION OF EL TOR.

By one of the Nursing Staff.

The pilgrimage to Mecca has been a very large one this year, about 100,000 pilgrims visiting the sacred shrine, of these nearly 40,000 coming from the north. Now that the season is practically over, an account of the measures that have been successfully taken to fight the threatened epidemic of cholera may prove of interest. Two objects have been kept in view; one to prevent any pilgrim from returning to Egypt without passing through Tor, and the other to stamp out the epidemic by fighting it in the most efficacious manner at the quarantine station, and allowing the pilgrims to leave only when they are considered incapable of carrying infection. On the arrival of steamers the pilgrims are visited by the quarantine doctors, all

healthy pilgrims are disembarked in large boats, towed to the landing stages and taken to the sections. A section forms a rectangle, 200 metres long by 50 metres wide, enclosed by a high fence and separated on both sides from the next section by a vacant plot of similar dimensions. The ground is laid out in four rows of 25 tents, each tent to hold six pilgrims. At the corners are the tents for the doctor, sanitary guards, and the representative of the Ministry of the Interior. Each section contains a general provision store, a restaurant, and the necessary sanitary provisions. The pilgrims are visited individually twice a day by the doctor of the section, who sends any sick to hospital. In cholera times the period of quarantine is fifteen days, provided that the health of a section remains good; but if at any time a case of cholera occurs in a section the whole period of quarantine begins again. The sick are, however, conveyed straight to hospital and the dead brought ashore and buried. the ships and everything on board are thoroughly disinfected and during the rest of their stay are constantly

visited by the doctors. Disinfecting the Pilgrims.-The camp consists of bathing and disinfecting houses, sections, hospitals, offices, store rooms, dairy, tents for the president, the staff, the servants, and the soldiers. When the healthy pilgrims from a ship are disembarked they are taken first to the bathing and disinfecting houses, one of which is reserved for women, and is in charge of an Englishwoman. Their goods and clothing are put in numbered sacks, which are subjected to a heat of 120° F., for twenty minutes in the disinfecting ovens; but everything which would be spoilt by heat is soaked instead in a solution of corrosive sublimate. Meanwhile the pilgrims are taken into spacious dressing rooms and there provided with long calico garments before passing on to the bath-rooms. Here they have a choice of hot or cold douche, or hot or cold sea-water bath, for which a special soap is provided. The bath over, they go on to adjoining rooms, where their disinfected clothes and goods are handed back to them, and while they are dressing the quarantine doctor visits them, and a list of their names is taken by the passport authorities. The pilgrims are passed through in batches of forty, each batch occupying about an hour. After these preliminaries are gone through, the goods are put upon a small train kept running between the different parts of the encampment, and all the pilgrims from one ship follow to the section destined

The Hospitals.—There are three hospitals built of masonry, two containing 30 beds each and a small bedroom for the doctor in charge, and the third containing two wards of 10 beds, one ward reserved for women and one for surgical cases. There is a well-appointed, up-to-date little theatre, and also two extra rooms which came in very useful this year for members of the staff who, unfortunately, broke down. Near the gate of the hospital enclosure is the bathing and disinfecting house, and close by is the laundry. There is also a well-fitted bacteriological laboratory. There is an enclosure fenced off and containing wooden huts with adjustable ventilating shutters, and containing two beds each. This was used for isolating cholera and other contagious cases. There is yet another en-

closure containing tents for housing suspected cases. As all these different enclosures became full it was necessary to erect tents, until there were about 50 with two patients in each. The staff consists of the director, five or six other doctors, and a bacteriologist, trained European sisters (English, German, and Greek), and Arab nurses, both male and female.—Extract from 'The Hospital," August 2nd, 1902.

# Current Miterature.

CHINESE versus European Rhubarb. — Dr. S. Jakabházy describes the differences in markings which may serve as points of distinction between the two kinds. European rhubarb is characterised by relative freedom from crystalline glands and comparative richness in starch. There is a difference, too, in mineral matter which in Chinese rhubarb amounts to from 8 to 25 per cent., being only 1·3 to 6 per cent. in European species. The safest means of discrimination is, however, a quantitative determination of the essential principles. The author found as follows:—

	Extract by Anmoniacal Alcohol	Chrysophanic Acid	Emodin	Pseudo-emodin and Pseudo-frangulin	Frangulic Acid	Double Glucosides
Chinese I.	 47.3	3.71	1.70	2.64	3.91	21.2
,, II.	 39.5	2.92	1.31	2.33	3.21	22.3
,, III.	 41.2	3.07	1.43	2.19	2.87	19 6
English IV.	 36.3	1.86	0.59	1.36	1.88	20.5
,, V.	 33.5	0.80	0.38	1.21	1.04	15.3
Austrian VI.	 27.5	0.54	0.41	0.69	1.70	14.7
" VII.	 30.7	0.70	0.47	0.83	2.02	19.3
French VIII.	 31.2	0.74	0.38	0.68	1.71	16.4

The Chinese are seen to be far richer in chrysophanic acid and emodin than are the European.

In reference to the above "Double Glucoside," a paper of importance - bearing in view the wide use of the drugs in question—appeared in the Apoth. Ztg. (May 31st, 1902), by Dr. Aweng, describing his method of isolation and the properties of the compound. Briefly, he prepares firstly an aqueous extract, which after concentration is treated with four volumes of absolute alcohol and the filtered solution evaporated to small bulk, the residue dissolved in cold water leaving rhamnetin and pseudofrangulin in the insoluble portion. The aqueous solution again concentrated is taken up with a large volume of absolute alcohol, the precipitate formed containing frangulic acid (a non-glucosidal body yielding by acid treatment two rhamnetin-like substances). The alcoholic solution contains the double glucoside of which the yield is 5 to 6 per cent. This compound in the first stage of hydrolysis splits into a sugar, a little emodin and chrysophanic acid, and further a substance corresponding to the author's pseudo-emodin (Tschirch's Nigrin, Leprince's Cascarin); this in turn is a compound of emodin chrysophanic and frangulic acids.

More severely treated (two hours' boiling with HCl), the double glucoside is decomposed into much emodin, some chrysophanic acid, and the two frangulic acid decomposition products, whence it would appear to have a very complex composition. It affords a safe, sure and mild purgative, and for galenical use the author recommends an extract made with 80 or 90 per cent. alcohol. The glucoside is very sensitive to both acids and alkalies.

A somewhat similar compound has been separated not only from frangula bark and rhubarb, but also from senna and sagrada.—Zeils. d. allg. oesterr. Ap. V.; also Apoth. Ztg., 1902, 358.

A CLINICAL, BACTERIOLOGICAL AND ANATOMO-PATHOLOGICAL CONTRIBUTION TO THE STUDY OF LEPROSY OF THE NERVOUS SYSTEM, OF SYRINGO-MYELIA AND OF MORVAN'S DISEASE.—Dr. Calderone sets forth his experience respecting leprosy and Morvan's disease. He comes to the conclusion that Morvan's disease is a form of leprosy, and supports this assertion by his discovery of Hansen's bacillus in the lesions of the disease.

The differentiation of syringomyelia from leprosy is not easy in countries where leprosy prevails. Notwithstanding the fact that sensory dissociation is found in both diseases, the author considers syringomyelia is a specific ailment. He advises particular attention to maculæ of the skin, enlargement of the spleen, and intermittent fever as the differential diagnosis of leprosy.—Giorn. Ital. delle Mal. Ven. e della Pelle, 1901, fasc. vi., p. 756.

CONGENITAL MALARIAL FEVER.—Dr. Lindsay Peters reports the case of a child born at term during a malarial paroxysm of the mother. After reviewing the literature, the author says that since it is well proved that many varieties of bacteria are able to pass from the maternal to the feetal circulation, it is prima facre likely that "a minute organism possessing the active amœboid motility and penetrating power of the malarial parasite should be able to do so." The mother had been once cured of tertian fever. The attacks recommenced in the spring of 1898, she being at the time pregnant, but again disappeared under treatment, to return on the day of confinement. On the third day the mother had a chill and a temperature of 104° F. An examination of fresh blood specimens the next day showed typical, half-grown, tertian malarial organisms. The baby was a healthy boy. Blood from the ear showed no organisms on the first two days. On the fiftieth day after birth the child was seen and found to be sick, pale, unwilling to suck, anæmic, and yellowish. The lower border of the spleen could be felt. The next day a specimen of blood was pale, watery, and coagulated very slowly. Three malarial parasites of the tertian type were found -one small, extracellular, pigmented form, and two half-grown intracellular forms containing light brown dancing pigment. Quinine removed the anæmia and other symptoms in a few weeks. The child was reported to have "got cold and had fevers" from the second week after birth. In infants well-marked chill is said to be rare, and to be replaced by "cold hands and feet, blue lips and nails, sometimes slight general cyanosis, pallor, drowsiness, and prostration." From these considerations the author concludes that the affection was not recent, but had been acquired in utero, or very soon after birth. The latter was considered highly improbable, and the author inclines to the view of intrauterine infection.—Johns Hopkins Hospital Bulletin, June, 1902.

A new reaction for quinine and quinidine has been discovered by E. Hirschsohn, and consists in the addition of one drop of hydrogen peroxide solution (about 2 per cent.) and one drop of 10 per cent. cupric sulphate to the neutral alkaloidal solution (chloride or sulphate); on boiling, an intense raspberry-red coloration appears, changing to bluish-violet, then blue, and after a while, slowly to green. The limit of sensibility is 1 in 10,000. As in every such test it is highly important to know upon what other substances it has been tried, the following list increases the value of the reaction very considerably. A colourless or only faintly yellow solution is obtained with antipyrine, atropine, aconitine, acolyctine, asaron, brucine, berberine, bebeerine, caffeine, cocaine, cinchonidine, cinchonine, cinchonamine, cinchotenine, codeine, colchicine, colocynthin, convallamarin, convallarin, coumarin, cubebin, caryophyllin, delphinin, daturine, digitin, digitalin, duboisine, gelsemine, helenin, hyoscine, hyoscyamine, kosin, meconin, minispermine, piperine, picrotoxin, pilocarpine, quassiin, quinoline, solanine, saponin, santonin, salicin, senegin, scoparine, sabadilline, sparteine, strychnine, taxine, theobromine, urson, vanillin, veratrine. The following give yellow to brown: Analgene, apomorphine, arbutin, æsculin, chelerythrin, cotoin, duboisine (amorphous), eserine, hydrastine, hydrastinine, morphine, narceine, narcotine, paracotoin, papaverine, peucedanin, phloridzin and pyrodine. A light onion-red is produced by thalline, an intense blue by kairine, and a light blue by asparagine. The peculiar raspberry-red tint is observed with euquinine, but only feebly, so that this colour when strongly developed seems quite characteristic of quinine or quinidine. — Pharm. Centralh. Süd. d. Ap. Ztg.

#### CHOLERA IN EGYPT.

During the week terminating September 22nd, 6,388 cases of the disease were reported in Egypt, and 4,022 cases during the week ending September 29th, thus showing a decrease of 2,366 during the latter week: 1,932 towns, villages and ezbehs are now reported to be infected in Egypt, showing an increase of 375 during the last fortnight.

#### PLAGUE.

#### PREVALENCE OF THE DISEASE.

India.-During the two weeks ending September 20th, the total number of deaths from plague was 15,569. The districts most severely affected include the Bombay Presidency, Mysore, the N.W. Provinces, and Oudh. The epidemic is spreading rapidly, and Bangalore City and Kolar Gold Fields are now involved. In the Punjab the mortality for the week ending September 13th was 101, and for the week ending September 20th, 90-a decrease of 11.

Egypt.—During the week ending September 21st there was only one case reported and no death, and during the week ending September 28th there were four fresh cases and two deaths. All the cases occurred in Alexandria.

Mauritius.—During the week ending October 2nd there were nine cases and eight deaths, and during the week ending October 9th, fourteen fresh cases and eleven deaths.

#### EXCHANGES.

Annali di Medicina Navale. Archiv für Schiffs u. Tropen Hygiene. Archives de Medicine Navale. Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie. Australasian Medical Gazette. Boletin de Medicina Naval. Boston Medical and Surgical Journal. Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology. British Medical Journal. Brooklyn Medical Journal. Caducée. Climate. Clinical Journal. Clinical Review. Giornale Medico del R. Esercito. Hong Kong Telegraph. Il Policlinico. Indian Engineering. Indian Medical Gazette. Indian Medical Record. Janus. Journal of Balneology and Climatology. Journal of Laryngology and Otology. Journal of the American Medical Association. La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal Medical Brief. Medical Missionary Journal. Medical Record. Medical Review. Merck's Archives. New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyelinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo. Sei-i-Kwai Medical Journal. The Hospital. The Northumberland and Durham Medical Journal. Treatment.

#### Motices to Correspondents.

1.—Manuscripts sent in cannot be returned.

 As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the

5.—Correspondents should look for replies under the heading "Answers to Correspondents.

# The Journal of Tropical Medicine.

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## Original Communications.

NOTES OF A TOUR IN THE NORTH CANARA DISTRICT OF INDIA IN SEARCH OF MOSQUITOES.

By E. H. AITKEN.

LAST March I was deputed by Government to visit some of the Customs posts on the frontiers of the Portuguese territory of Goa, and to see whether anything could be done to reduce the malaria from which our guards suffer. The frontier line begins near to the old seaport of Vingorla in the Rutnagherry district, and strikes inland till it reaches the top of the Ghauts, when it turns south and runs for a distance of about fifty miles, as the crow flies, along the crest of the ascent, at a distance from the sea ranging between twenty and thirty miles. Then it turns west and descends to the level of the sea, which it reaches a little south of Karwar in the North Canara district. The country through which it passes, especially towards the south, is to a great extent primitive forest, the home of the tiger, the black bear and the bison, and of many striking birds, such as the Great Horn-bill and the Racket-tailed Drongo. It is inhabited by a race known as Coonbie. What connection there is between them and the Coonbies who constitute the ordinary peasant class of the Deccan is an undetermined question, but these more resemble the aboriginal hill tribes in many respects. They practise what is called Coomrie cultivation, as far as they are allowed, cutting down and burning much forest for a little coarse grain, and they also cultivate rice wherever they can find a few acres of level ground contiguous to a stream. Off this they raise two crops, one in the monsoon and another in the hot season. season rice is responsible, as will be seen further on, for much of the malaria with which this beautiful region is afflicted. It is a fact which those acquainted with other parts of India have difficulty in believing, that the fever season here is not September and

October, but April and May. The reason is not diffi-cult to divine. The rainfall is exceedingly heavy, amounting to 300 or 400 inches a year, and during the monsoon and for some months after it all the rivulets and streams are rushing at a rate which makes larval life impossible. From November to February, moreover, the cold at night is often severe. But by the month of March the weather has begun to get warmer, and the streams have shrunk and got broken up into detached pools, the process being aided by the masses of dead leaves which have fallen from the forest. Thunder-storms are also frequent at this period, filling every small depression in the ground where they occur, but too local to flood the streams. And by this time also the natives have diverted the water of many perennial streams into their fields, and by a skilful arrangement of dams, converted these into still, but not stagnant, pools a few inches deep. In these hot season rice-fields there appear to be few, if any, fish, and there are plenty of weeds to afford larvæ cover from their enemies. It is no wonder, therefore, if this is a season of prosperity and increase for the whole mosquito tribe, and also for the parasites of malaria.

Having been in this district before, I was partly aware of these conditions, and so chose the month of March for my tour, but I was delayed, and so did not reach Castle Rock till the 27th of that month. Castle Rock is the frontier station of the Portuguese Railway, where it connects with the Southern Mahratta line, and I decided to begin here and go southwards, the southern half of the frontier being much more malarious than the northern. Castle Rock is not considered a malarious station, the houses being mostly built on high ground and well exposed to the wind. I caught several specimens, however, of A. christophersi (Theobald) on the second day, in a cowhouse, and also in a shed in which goats were kept. I may mention here that throughout this trip I had very little success in catching mosquitoes. If this had been true only of the wily Anopheles I might have

ascribed it to my own want of skill or patience; but it was equally true of Culex. In camps at which the servants complained that they had not been able to sleep owing to the persecution of "mutchers," 1 I failed in the morning to find a single winged thing, My inference is that in open country mosquitoes are compelled to spend the day in houses for shelter from the sun, but that when cool and shady jungle is near at hand they prefer to retire into it. That there were mosquitoes in plenty was proved by the number of larvæ which I found. Within two days I had collected a most puzzling variety of forms, many of which were quite strange to me. I was unprepared for this and unprovided. Knowing the difficulty of transport in these wilds, I had reduced my luggage to absolute necessaries, and the few soup plates, saucers and finger-bowls I could muster hardly sufficed to accommodate those varieties of larvæ which it was most important to keep separate. And in the middle of some critical observation my boy would come and demand the saucer because it was tea-time. When I travelled it was still more difficult to find bottles to hold all my menagerie. All travelling had to be done on foot and all baggage carried on coolies' heads. As my time was limited, I had often to march on consecutive days, in fact, I moved six times in the course of one week. The result of all these embarrassments was that I lost some valuable specimens, and failed to rear some interesting larvæ. If I ever undertake such a tour again, I will provide myself with a dozen white saucers and as many wide-mouthed bottles with good stoppers.

To return to Castle Rock. I spent five days there collecting, rearing and trying to discriminate. I also visited Anmod, a small outpost, five miles distant, at which our men were said to be suffering much from fever at the time. I found that their lines were situated within a hundred yards of extensive rice-fields, in which, after much fishing with a white teacup, I found numerous larve of Culex fatiguns and of an Anopheles which I did not recognise at the time and lost afterwards. They were probably A. christophersi, which I found to be the commonest larva in rice-fields elsewhere. I could devise no way of "curing" a rice-field, so I recommended the removal of the lines to an airy site at some distance,

and I believe this is to be done shortly. The next post with a bad reputation was Diggi, situated on one of the principal trade routes from Goa, and consequently an important station with a considerable staff. At Castle Rock I had enjoyed the hospitality of Mr. Pogson, the Assistant Collector in charge of the whole frontier, and, as he had business at Diggi also, we travelled together. I need scarcely say that the society of another white man was welcome in these ever delightful, but weirdly solitary, wilds. At Diggi we found that both clerks and peons had been suffering from fever for some time past, and it did not take long to find the sources of infection. Not far from the lines behind there was a small stream flowing through dark jungle. At one point, where it crossed a path, it had been dammed so as to form a pool at which the cartmen might water their cattle, and here I found larvæ at once. Most parts of the stream were too shady for them. In front of the lines and somewhat further away there was another stream flowing into rice-fields, and in the middle of these a small tank, absolutely choked with watergrass and swarming with larvæ, from which I reared A. christophersi. There were said to be fish in the tank, but they had no chance in the midst of vegetation so rank. So our unfortunate men had the enemy behind and before. The Inspector, Mr. Hoogwerf, on the other hand, lived on a low hill far from any standing water, and he had not found Diggi to be a feverish place at all, either for himself or his men.

Leaving Diggi and Mr. Pogson, I went on to Bamnia, regarded as one of the most feverish places on the frontier. Here I found rice-fields within one hundred yards of the lines, and though I got very few larvæ actually among the rice, they were plentiful in some moist ground adjoining. These were A. in some moist ground adjoining. christophersi. On the other side of the lines there was a shady stream broken up into small, rocky pools, in which Culex and Stegomyia larvæ were plentiful and Anopheles not wanting. As I was clearing the bed of this stream with a gang of men the mosquitoes kept us very lively. Passing on to Kundal, another very unhealthy post, I found no rice-fields, but two streams within fifty yards of the lines. One was dry by this time, but the other was still running. It was a tiny rivulet, overhung by trees and bushes, the leaves falling from which choked the channel, so that the water filtered from one little pool to another. But the worst places, as usual, were the larger pools artificially formed by natives for watering their cattle and washing their clothes. Here I found larvæ abundantly and was able to give the Customs guards a good lesson. After an hour's work we had the satisfaction of seeing the little streamlet running swift and clear, and sweeping away all insect life in its course.

As a contrast to these places, I may mention Dhokarpa, a post which I was told had been very feverish two or three months ago, but was free now. Inquiring about water, I was told that there was none except one deep well. I found the bed of a stream, however, close to the lines, and asked when it had dried up. The answer was, at the end of the year. The strange thing is that probably every man on the frontier has had malarial fever many times and is liable to get it again at any season, yet they all recognise that certain places are "feverish" at certain times, and those times prove to be connected with the condition of a stream or a rice-field within a distance of two hundred yards. It seems to show that, even without treatment, a healthy native will soon shake off the effects of one infection, and that when malarial fever is severe and general, re-infection must be going on actively. The subject is one on which I have little right to put forward an opinion, but I state the impression produced on my mind by the facts which I observed.

Up to this time I had been travelling at a level of about 2,000 feet above the sea. I now descended the Ghauts and visited some posts on, or not far from, the coast, which are notoriously malarial about the end of the year. I was too late! I was told that the

<sup>&#</sup>x27; Hindustani-mosquitoes.

fever had gone some time ago, and I searched in vain for the larvæ of any kind of Anopheles. There is no hot season crop of rice, and the streams were dry. In some there were still deep pools, full of dead leaves, but in these I found nothing. I came across one little rivulet, running sweetly and drawing a green line across the fields and along the side of the road, and here larvæ were plentiful, but happily we had no Customs post near to that place. All I saw in this tour confirmed me in a conclusion to which I came some time ago, that the one condition essential to make water habitable for Anopheles larvæ is that it should not be absolutely stagnant. They may be found in a filthy puddle or ditch if the tiniest stream of fresh water trickles into it, in a garden tub or eistern if it is freshened occasionally by rain, in a fountain if it plays sometimes, in a well if it is fed by a spring. And in rearing larvæ it is most important to change the water partly every day. With Culex larvæ there is no need to do this. The reason may lie in the nature of their food, but I do not think we really know yet what the food of Anopheles larvæ is. They are said to feed on confervæ, and I have often seen them browsing on those myself; but were they eating the confervæ or animal organisms on them? I am sure I have seen them eating the parasites off their own bodies and those of each other, and there is no doubt that they are very fond of animal food in other forms, for they always eat their own cast skins, and there is no situation where they may be found in greater numbers than in those collections of cast skins, dead midges, and other insect remains which may often be found on the surface of a pool. I have repeatedly watched them eating these remains. They feed almost incessantly as they float, fanning the water with their brushes and sending a current past their mouths, but the particles which they secure in this way may be either animal or vegetable. Some species also spend a good deal of time lying at the bottom and feeding on some nescio quid among the earth. In Bombay my experience has been that there is no sort of place in which they may be looked for with more certainty than pools formed by rain in freshly dug ground, which may help to explain the old theory about malaria being liberated from virgin soil. I think, however, that another reason why Anopheles larvæ cannot live in absolutely stagnant water may be that it favours the infusorian parasite to which they succumb so readily. The larvæ of Culex do not seem to be nearly so subject to this.

With respect to the practical results of my tour little can be said yet. I did not expect that anything I could do personally would effect much. My aim was to educate the more intelligent among our peons, and especially the petty officers, to take measures for their own protection. The results in this direction were distinctly encouraging. I found the men very ready to believe that fever was caused by the bites of mosquitoes, but none of them had the least idea that there was any connection between "fishes" which swim in water and "flies" which fly in air. When veritable mosquitoes were bred from the said fishes before their eyes all scepticism vanished and they entered keenly into schemes for the destruction of the miraculous vermin. The European Inspectors in

charge of the several beats also entered into the work with interest, as was to be expected. I did not encourage the use of kerosene oil. It is valuable as a last resort, but besides the objection that its effect is only temporary, it fouls the water and kills all the harmless and useful insects in it. I relied upon clearing the beds of the streams and connecting the detached pools, so as to induce a regular flow. Hollows in rocks were filled up, or emptied. course it was too late for any marked results to appear this season, but I hope that next year vigorous measures will be begun in time and maintained which will change the character of some of our most unhealthy posts. Where the focus of malaria is a rice field there is no hope, but I believe that it will be made a rule of the department soon, that lines are never to be built within a quarter of a mile of rice cultivation. Where there are lines so situated which cannot at once be removed, the experiment will be tried of destroying all intervening brushwood and

A REPLY TO DR. BRADDON'S PAPER ON AN "UNDESCRIBED" HÆMATOZOON TO BE MET WITH IN THE MALAY PENINSULA.

By J. TERTIUS CLARKE.

District Surgeon, Lower Perak, Malay Peninsula.

In the Journal of Tropical Medicine of September 16th, 1901, Dr. W. L. Braddon describes a new organism as the most frequent hæmatozoon to be met with in the Malay Peninsula, and has applied to it the term "mycoid." It is to be demonstrated by a process of wet staining, whereby a mixture of blood with a solution of methylene-blue in a 1 per cent. solution of potassium citrate is passed between a slide and cover-glass by capillary action.

and cover-glass by capillary action.

In 152 out of 163 cases, Dr. Braddon says that this organism was certainly present, and in 98 was present alone, so that out of 163 cases of fever, in 11 only were the other ordinary organisms present alone, and it is to be gathered from this paper that he considers it the most frequent and, as the expression "severe fever" is used, the most important cause of

fever in this country.

The appearances described are easy to see, in fact may be seen in almost every blood examined; it is not common to find a blood which does not exhibit them. My first few examinations were made upon blood from people who were fever free. I found it in a man who had not had fever for about two years, and was perfectly healthy; then in a woman who was menstruating, but who had never had fever; again, in a man who said that he had never had fever, and in another who had had fever for two days two years previously; in a cat apparently healthy, and it was found by a friend, Dr. Edgar, of Ipoh, in a dog and a frog. In these cases at least there was no connection between the so-called organisms and fever, but when I began to examine the blood of fever cases, my results as regards the finding of the ordinary forms differed considerably from those of Dr. Braddon; he failed to find the ordinary forms in 98 of his 163 cases, that is, in 60 per cent. I have examined 54 cases of fever, and have found mycoids in 49 of these, but the ordinary forms in 43, or 79.6 per cent., two of my failures having had quinine. In many of these cases it has taken a considerable time to find the well-known organisms, partly due perhaps to lack of skill, but partly due to the frequent scarcity of the organism in the peripheral blood in some of the worst cases of fever. For instance, in one case of tertian fever, in which there were more mycoids than in any other case that I had examined up to that time, I had to examine five cover-glass preparations, three of them being stained, before I was able to find an organism; then, however, I found a few tertian rings; this difficulty I have met with more than once.

Dr. Braddon says that "the severity of the fever, and especially the resultant anæmia, have seemed to be in direct proportion to the numerical extent of the

invasion.' I do not find that the numbers are in proportion to the severity of the fever. I do not find many in the early stages of fever, but very many in the malarial cachectic, and instead of speaking of the resultant anæmia, I should say that the numbers present are in proportion to the accompanying anæmia, of which it seems to be a denominator to a certain extent, rather than a cause. I have found them in the largest numbers in very anæmic cases which are not necessarily having fever; the blood containing the greatest numbers that I have come across was that of a person who was extremely anæmic, and whose stools contained ankylostomum ova. I have found many in the blood of a dysenteric patient who had been free from fever for a month; others showed large numbers who had had a long history of fever, but whose blood contained crescents, in whom, therefore, there is no need to ascribe the fever and anæmia to other than ordinary malarial parasites. In a case of spleno-medullary-leucocythæmia, sent to me by Dr. Edgar, there were many mycoids present, no fever, no history of fever, and no malarial organisms, but, as is usual in these cases, many nucleated red cells.

I have found mycoids also in people who on admission had fever and ordinary malarial organisms, whose fever was cured by quinine, but whose blood, after they had been free from fever for a considerable time (in one case a month), still showed many mycoids. From my results of the examination of the blood of man:-

(1) Mycoids are present in almost every blood examined, including that of the perfectly healthy.

(2) That in fever cases the ordinary organisms can

almost, if not quite, always be found.

(3) That when present, the periodicity may be quotidian, tertian, or quartan, such periodicity seeming to depend on the malarial organism present, and to be unaffected by the mycoid.

(4) That perhaps most mycoids are to be found in cases of anæmia due to such causes as ankylostomum, or chronic dysentery, where, if present, fever is of secondary importance as a cause of the anæmia.

(5) That though the fever is cured by quinine the mycoid appearance is not removed.

My conclusion is therefore opposed to Dr. Braddon's, namely, that the mycoid appearance has nothing whatever to do with fever of any sort.

Most of the men with whom I have been able to

discuss this matter have regarded it not as an organism, but as an accident of staining—as an artifact; if so, it is an artifact more readily produced in some bloods than in others.

A reason in favour of its being an artifact is that the fluid used is not isotonic. In many specimens the hæmoglobin is dissolved out of the corpuscles, and as the mixture of blood and solution is not a perfect one, but varies in different parts of the preparation, it is to be expected that the hæmoglobin loosening effect will vary in different parts, and this is the case; in some parts there are many corpuscles freed of hæmoglobin, showing the appearances described particularly well, in other parts few of them have lost the hæmoglobin and here often not so many of the mycoids are to be found; this, however, does not prove that the appearance is artificial. I do not think that it is an organism; the motion described is the only point in favour of the view that it is an organism, and this, though I have failed to see it, is not conclusive. The numbers present in some bloods are so great that if it had any pathogenicity death might be expected at once, instead of large numbers being compatible with a considerable duration of life; in fact, instead of being pathogenic, I believe they are rather a sign of an attempt on the part of the organism to recuperate.

If not an organism, and if not an artifact, there still remains the possibility that it is a part of the blood corpuscles present under certain conditions.

Part II. of Dr. Braddon's paper, which was published in the JOURNAL OF TROPICAL MEDICINE, November 15th, 1901, in which he gives reasons for the belief that blood platelets are the precursors of the red cells, perhaps provides a clue as to what the mycoids may be. In it he deduces that the lymphocytes change by degrees to hyaline, then to transition, and then to polymorphonuclear cells; that the nuclei of these by subdivision or diffusion throughout the protoplasm give rise to these blood platelets, which in turn become converted into red corpuscles; the cyanoplasm of the platelet being possibly thrown out or gradually absorbed by the plate of stroma; that is to say, he deduces that the red cell has originally a nuclear origin.

The nuclear constitution of the platelets has been shown by Lilienfeld, who by artificial pepsin-hydrochloric digestion was able to differentiate them into a pale homogeneous sphere and a nuclear mass; the fact that they are amphophilliæ may also point to a constitution partly nuclear. Lilienfeld is inclined to regard them, not as separate constituents of the blood, but as derivations of the nuclei of the leucocytes. Be that so, even if the red cells are not derived from the platelets they most probably have a nuclear origin, and if produced in this way, or in any other way, from a nucleus, it is possible that after being formed, the nuclear remains may not disappear all at once, but that in certain conditions, such as in rapid blood destruction or formation-to a certain extent correlatives-more young cells holding the last remains of the nuclear antecedent, perhaps the chromatic part, are sent into the blood-stream, and that these remains may be shown by a method by which the basophilic stain can get into the corpuscle without causing complete destruction of a network which is extremely delicate and already almost disintegrated. It is

possible that this last remnant of the creating nucleus, existing as it probably does in the central homogeneous cell protoplasm, on any process of fixing, is absorbed by, or intimately mixed with, the eosinophilic layer, so that it fails to take on the basic stain, being after its admixture too finely divided or otherwise changed to show its natural staining reaction, or perhaps even taking a faint neutral colour. The phenomena of polychromatism and of Plehn's dots may be explicable by the occurrence of the remains of a nucleus in the eosinophile layer; this, of course, is assuming that polychromatism is a condition of young cells and not a degenerative change. Many of the mycoids in human blood and in that of the embryo kitten, to be mentioned hereafter, resemble nuclei, though many of the denser ones are perhaps more filamentous in structure than any nucleus except those undergoing mitosis. The nuclear framework of a typical normoblast is described as consisting of a rather sharply defined network of chromatin having relatively wide intervening open spaces, so that the general appearance of the nucleus is not unlike that of a coarse net; this description is applicable to some of the mycoids and if one or two of these were present alone without the thread-like forms, they would most likely be called nucleated red-cells. In some very anæmic blood specimens which contained large numbers of mycoids, nucleated corpuscles were fairly common, as for example in the blood of the case of spleno-medullary leucocythemia before mentioned.

Believing that the mycoids are in reality the last remains of a nuclear progenitor, I turned my attention to very young blood, and examined several by the wet method described by Dr. Braddon. The first blood examined was that of an embryo crocodile which I got out of the shell—the hatching out would have taken place in perhaps five or six days. In this every red cell had fine blue-stained branched filaments radiating away from the nucleus, spreading through the entire cell, and forming, as it were, a fine network, on which the rest of the corpuscle seemed

to be built up.

The outline of these cells, out of which the hæmoglobin had been dissolved, usually took the blue stain, suggesting that there is really a cell membrane, which is originally continuous with the nucleus by means of the filamentous processes, and I believe that the absence of the staining of this membrane will account for Dr. Braddon's description of some of these mycoids being free in the plasma. On taking blood from the unhatched egg of the fowl at various periods, a gradation was seen. In the blood of an egg which had only a very small streak of blood in it, the majority of the cells, on being treated by this method, were more like lymphocytes than red cells, the outer protoplasmic rim was more deeply stained than the nucleus; though the intensity of the stain varied, all the cells were circular. In the blood of a chicken about one week prior to being hatched, many of the cells were still circular; all had blue-stained filaments and dots, and some a blue halo of very fine filaments round the nucleus. On the following day there were fewer circular cells, but otherwise the appearances were similar, though less marked, and the lessening of the number of cells with filaments or with haloes round the nucleus went on until in an egg, which I expected

to hatch out on the following day there were very few and only indistinct filaments and no haloes. In the blood of the freshly hatched out chicken these mycoid filaments were difficult to find, in fact, the blood became like that of the adult frog, a few of the cells having blue-stained filaments. In none of these bloods did the filaments seem to join up the nucleus to an apparent limiting membrane, but there is an interval of about a week from about the eighth to the fifteenth day, during which I did not examine the blood of hatching eggs.

In all these bloods, whether of frog, chicken, or unhatched egg of chicken or crocodile, were the nucleus taken away these filaments would undoubtedly be described as Dr. Braddon's mycoid organism.

The blood of a kitten taken from the cat about one week prior to normal birth showed almost similar appearances to that of the unhatched eggs; very many blue-stained filaments and aggregations of filaments were seen, in fact, every gradation was present, from a few of the finest threads up to what was indistinguishable from a nucleus except that the filaments seemed rather more distinct. This blood was like the blood of the best specimens of mycoid containing blood that I have obtained from fever or anæmic patients.

On dry staining very many cells were amphophillic and some might even be described as basophillic; of the staining of the appearances described I am not certain, but I think that they can be seen to have taken on a neutral colour, so that in an eosinophillic mass the difference presented by filaments which cannot be seen by an ordinary \( \frac{1}{6} \)-inch objective would naturally not be very marked, especially if there is a disintegration of them during the process of drying

and fixing.

So from the result of my examinations of the blood of the unborn of an amphibian, a bird and a mammal, I should say that the mycoid filaments are the remains of the branching in some cases, or the breaking up in others of the original nucleus; that red cells have all a nuclear origin and an undoubted cell membrane, which is originally connected with the nucleus, but perhaps ultimately separated by the growth of the cell, during which process in mammals the remains of the nucleus is completely absorbed.

In one of the fever cases in which I failed to find mycoids the man was moribund, and it is possible that in him the formation of red cells had ceased, in which case, if my theory that this mycoid appearance is only to be found in young cells, be correct, it is not to be expected that they would be found. In another man they were not found, he had no fever, was

healthy, but below par.

If, as Dr. Braddon alleges, this mycoid is the most frequent cause of "severe fever" in this country, it will not be of much use to expect Government or private individuals to use measures for the prevention of the fevers caused by the parasites whose life history is known, until the life history of this is known also. If, on the other hand, this mycoid is not an organism, but a purely physiological phenomenon, as I believe I have shown, the statements made by Dr. Braddon should not be allowed to delay the prosecution of those means which have been shown to be efficacious in the prevention of fevers.

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# Journal of Tropical Medicine

NOVEMBER 1, 1902.

## A RECENT ADDITION TO TROPICAL PARASITOLOGY.

The case of trypanosoma which we report in this issue of the Journal opens up a new field for In the JOURNAL investigation and elucidation. OF TROPICAL MEDICINE for September 1st, 1902, we published an article by Dr. R. M. Forde, on "Trypanosoma found in the blood of a European," and gave an illustration of the parasite. The patient from whose blood this parasite was obtained was shown in Liverpool on August 1st, 1902, to the members of the Section of Tropical Diseases who visited Liverpool during the meeting of the British Medical Association at Manchester. The disease was at the time regarded rather in the light of a curiosity, but the discovery by Dr. Daniels, Superintendent of the London School of Tropical Medicine, of the same parasite in a patient in whom the disease was suspected by Dr. Manson, alters the whole aspect. What was then regarded as a curiosity has by the discovery of a second case brought us face to face with a possibly fairly widely, or even widely, distributed disease. Whatever the geographical distribution may be, the fact remains that the trypanosoma in the blood occasions a definite ailment, associated with pronounced clinical signs and symptoms. A new clinical fact is before us, a new fact in parasitology. In West Africa and in the Upper Congo, at all events the districts from whence Dr. Forde's and Dr. Manson's cases were obtained, the possibility of encountering the disease must be remembered, and it is possible that far beyond these areas the parasite and its attendant clinical features may be met with in other districts and in other continents.

The discovery is another step in the disentanglement of tropical ailments. The enormous mass of diseases grouped together, merely from the fact that they were tropical, is being reduced bit by bit, as now this investigator and that observer throws light on this or that ailment, which had previously been believed to belong to the mass -tropical. Malaria served for many years as a cloak to render our ignorance obscure, yet from its colossal mass many diseases have been abstracted, including such well-established specific ailments as beri-beri, kala-azar, &c., and even such distinct diseases as hepatic abscess and dysentery, and the many febrile states met with in filariasis, Many other ailments have been siriasis, &c. dissociated from the chaotic mass and it is satisfactory to know that work in this direction The latest discovery-that of is advancing. trypanosoma in the blood of man-is but another evidence that our knowledge of tropical diseases is progressing, and that the scientific workers of to-day are establishing a basis for future investigation which will redound to their credit for all time.

#### A CASE OF TRYPANOSOMA IN A EUROPEAN AT THE SEAMEN'S HOSPITAL, ROYAL ALBERT Docks, London.

Under the care of Dr. Manson, C.M.G., F.R.S.

DURING the meeting of the British Medical Association in Manchester, last August, Dr. Manson had the opportunity of seeing a patient in whose blood trypanosomes had been found by Dr. R. M. Forde. He was struck by the peculiar clinical facies, the chronic irregular fever, the enlargement of the spleen, the ædema of the face particularly, and the very wellmarked erythema multiforme scattered over the trunk and limbs.

A month ago Dr. Habershon sent a patient to Dr. Manson for an opinion. The patient was the wife of a missionary on the Upper Congo, where she had resided for about a year. She stated that at first her health was fairly satisfactory with the exception of a few slight fevers, but latterly, the fever becoming more persistent and her general health impaired, she was invalided home, and since last December resided in England. Notwithstanding liberal drugging with quinine and arsenic, her condition was not improved. On examining her, Dr. Manson recognised the same grouping of symptoms that he had seen in Dr. Forde's patient. The fever, the enlargement of the spleen, the ædema of the face, not very marked but at the same time distinct, and the multiform erythema, made him suspect the nature of the case. He persuaded the lady to enter the Tropical wards of the Seamen's Hospital, Royal Albert Docks, so as to be near the London School of Tropical Medicine, where systematic examinations of her blood were made daily for a fortnight. No trypanosomes being discovered, arrangements were being made to test the tentative diagnosis by injection of the patient's blood into several of the lower animals. Before these arrangements were completed, Dr. Daniels, Superintendent of the School, while counting the leucocytes in the blood of the patient, came across an unquestionable trypanosome. On the examination being repeated, other specimens of the parasite were readily discovered. For some unknown reason the parasite must have been latent during the first part of the patient's residence in hospital, or so very scanty in the peripheral circulation that they were missed, although diligently sought for. It would appear, therefore, that Dr. Forde's case is no mere pathological curiosity, and that in future the pathologist has to reckon with a new disease-germ in man, with a geographical range probably involving the whole of Tropical Africa. And if Africa, why not Tropical Asia and America? Possibly in this parasite we have an explanation of some of the anomalous chronic fevers, such as kala-azar, which have hitherto defied investigation in tropical countries. We trust that those who have the opportunity will take advantage of it to determine the extent and practical importance of this new parasite; and that they will examine it in this light with the corresponding diseases of the lower animals, especially of surra, nagana and mal de caderas.

The case will be published in full detail in an early issue.

LABORATORIES IN THE PHILIPPINES.—A large central institution, in which laboratory work shall be done for all Government departments requiring scientific assistance, is to be established in the Philippines. There will be rooms for bacteriological diagnosis, for pharmacology, pathology, food analysis, &c. Altogether the building will contain sixty rooms. A serum institute also, with every requisite in the way of serum packing rooms, serum kitchen and crematory, is to be erected.

# British Medical Association.

#### BERI-BERI.

By L. W. Sambon, M.D. (Naples). London School of Tropical Medicine.

In the discussion on Dr. Manson's paper, Dr. Sambon said: Dr. Travers' observations and experiments are certainly interesting, but I fail to see how they can sweep away the enormous amount of evidence brought forward against rice not only by Baron Saneyoski, F.R.C.S.Eng., in his admirable report on the experience of the army and navy of Japan, but by the great majority of physicians of all times who studied the disease in China, Japan, the Dutch Indies, and Brazil. It is, of course, impossible for me to discuss Dr. Travers' experiments on the data furnished by Dr. Manson, but I will just point out that the rice, though supplied by the same contractor, was not the same in both gaols, because it was bought from several Penang merchants, who themselves collected it from many districts in separate bags. Then again it was only for a very short period (from October 1st to December 14th, 1895) that rice stored and cooked in the Pudoh Gaol was supplied to the inmates of the Old Gaol, and this whilst the disease was decreasing in the Pudoh Gaol.

Certainly, I do not think that rice causes beri-beri because of its deficiency in mineral and nitrogenous matters, but I am quite prepared to admit that it may be related to beri-beri in the same way as we now believe pellagra to be related to maize, or, in other words, that rice may become a vehicle of the beri-beri infection. Rice is used as a staple food over a far wider area than that in which beri-beri prevails, but the cause of the disease is not the rice itself, but perhaps some micro-organism which, in certain places and under certain conditions, may be associated with rice and possibly with other grain.

Within the endemic centres of beri-beri it has been frequently noticed that the disease is most common in communities supplied with rice of inferior quality, or with rice which has been carelessly prepared and badly stored. Paddy keeps sound for years, but the grain deprived of its pericarp is soon damaged by vegetable parasites. Dr. C. Eijkman, from statistics applying to 280,000 prisoners, showed that in the prisons of Java the proportion of beri-beri cases is 1 to 39 in convicts fed on decorticated rice (white rice), whilst it is 1 to 10,000 in convicts who consume the grain half peeled, that is to say, deprived of pericarp but still enclosed in its perisperm (red rice).

Besides fungi, there are numerous insects and mites that live on stored rice, and the granaries are constantly visited by mice and rats. Most interesting associations have been established between all these plants and animals that gather on rice. For instance, Pintus latro is a small beetle that feeds on rice in winter, its larva inhabits the excrements of rats. If rats were liable to beri-beri, as Lacerda suspected, the specific microbe might be conveyed in their excreta. I mention these facts merely to show how

complex might be the connection between rice and beri-beri.

Dr. Manson believes that beri-beri is due to a toxin prepared by a germ outside the human body, and possibly inhaled or absorbed through the skin. He bases his theory chiefly on analogy with the multiple peripheral neuritis of Europe, which is attributed to alcohol, and is, therefore, called "alcoholic paralysis." I doubt very much whether alcohol alone can produce peripheral neuritis. In this very town, two years ago, when there was quite an epidemic of multiple neuritis, Dr. E. S. Reynolds attributed the disease to arsenical poisoning, and stated how he had doubted for years whether ethylic alcohol caused neuritis. He had noticed that the disease occurred only in beer drinkers, and found that the beer contained arsenic. But if Dr. Reynolds' assumption can explain satisfactorily the Manchester epidemic of 1900, what about the outbreaks of multiple neuritis which occurred more than a century ago when beer was manufactured without the glucoses and inverts of modern chemistry? Dr. Lettsom, in his "History of Hard Drinking," published in 1789, describes multiple neuritis quite clearly; and multiple neuritis has occurred every year in Manchester, like other diseases of microbic origin, varying in prevalence from year to year in connection with as yet undetermined surrounding conditions; sparing some districts entirely, weighing heavily on others; attacking children as well as adults, and abstemious persons as well as drunkards.

If beer drinking caused the Manchester epidemic of 1900, what about the outbreaks of multiple neuritis which occasionally take place in Italy, in France, and in other countries where beer is never or hardly ever consumed; and if the disease is due to arsenic, which may be contained in wine as well as in beer, how shall we explain the immunity of the arsenophagous mountaineers of Austria and Styria, and that of the many patients, suffering from epilepsy, chorea, or anæmia, who are given excessive doses of arsenic?

I am inclined to believe that all forms of multiple peripheral neuritis, both in Europe and in the East, are the outcome of specific infection. It is quite possible, however, that the administration of alcohol or arsenic may favour the development of the microorganisms of multiple neuritis. These parasites, like aspergillus glaucus, mucor mucedo, and other arseniobacteria, may have a special affinity for arsenic and other poisons. We know that arterio-sclerosis and gout are especially common amongst lead workers, and we know that quinine may provoke relapses of blackwater fever; but in these and other similar instances the specific cause of the disease must also necessarily be present. Numerous experiments by Abbot, Delearde, Goldberg, Koch, and others have proved that the administration of alcohol to animals before infection greatly increases their susceptibility and destroys both natural and artificial immunity. Multiple neuritis occurs very frequently in the convalescent stage of the acute infections, such as typhoid fever, small-pox, influenza, pneumonia and diphtheria, or during the course of chronic diseases, such

as leprosy, syphilis, and tuberculosis; or, again, in the cachectic stage of the malignant neuplasia and of the intermittent fevers. It would seem, therefore, that, like alcohol, arsenic, lead, or carbon bisulphide, the microbic poisons of certain diseases were also able to prepare a substratum favourable to the development of the agent which causes multiple neuritis.

I believe that the specific agent of beri-beri lives within the patient's body, and attacks the peripheral nerves. I base this assumption on the clinical symptoms and anatomical data of the disease, which show. most strikingly, a different distribution of the pathogenic agency in different patients and in the same patient at different stages. Moreover, the same diseased nerve may show simultaneously normal fibres, degenerated fibres, and regenerating fibres, and the degenerative changes of the medullary sheath and axis-cylinder do not affect the nerve-fibre at once throughout its whole length, but proceed slowly from the periphery to the centre. Another point in favour of my supposition is afforded by the fact that beri-beri may remain latent for long periods within the system. This latency is evidenced by the length of the incubation period, which at times seems to extend over several months, and by the frequency of relapses in those who have contracted the disease. This latency of beri-beri has not been sufficiently appreciated. It accounts, I think, for the numerous outbreaks of the disease amongst gangs of coolies out at sea or landed in places in which beri-beri did not previously exist, and it explains the strict limitation of the infection to such gangs which has been so frequently observed, because undoubtedly beri-beri cannot spread any more than malaria in the absence of its peculiar agent of propagation.

In discussing the etiology of beri-beri we should not forget that although the primary cause of the disease is still unknown, there are many important epidemiological facts which have been thoroughly ascertained. Thus we know that the prevalence of beri-beri within its endemic area varies greatly from year to year. We know that the disease has a seasonal prevalence most noticeable in those regions which have marked seasons, and we know that its prevalence, like that of the intermittent fevers, is favoured by high temperature and an abundant rainfall. Then, again, we know that beri-beri is more common in certain races, not on account of a racial susceptibility, which does not exist as an ethnic character in any race, but because the stricken races inhabit beri-beri centres, or because their customs and habits bring them into closer touch with the cause Beri-beri is more prevalent amongst of infection. men than women, and amongst adults than children, but these facts only prove a greater exposure of the adult males, and not sex or age immunity. In fact, we know of several outbreaks limited to women or very young children, and we know of cases in suckling infants and in men over 70 years of age. Occupation is another condition which must be taken into account. Beri-beri may attack men of any class or occupation, but it is chiefly the disease of the common labourer. Beri-beri is known to attack robust, healthy men in the prime of life, but it has

a remarkable predilection for syphilitic and tuberculous patients; for those recovering from small-pox, scarlet fever, measles, typhoid fever, or dysentery; for women in the puerperal state, and for those suffering from eye diseases, from ulcers of the ex-

tremities, or from surgical wounds.

We are absolutely ignorant of the way in which the beri-beri infection is carried from place to place and from man to man. We know that usually the disease does not spread in hospitals among other patients when cases of beri-beri are admitted, and that it does not attack nurses or visitors. On the other hand, we know that the disease has been carried to new countries. Thus, it was introduced into New Caledonia in March, 1891, by a shipload of Tonkinese and Annamese prisoners. It broke out first amongst the prisoners and caused many deaths. After a time the disease spread, and in some instances proved fatal to certain natives, Kanakas, who had become associated with the Asiatics. Then, again, beri-beri is essentially a disease of collective dwellings such as gaols, schools, asylums, hospitals, barracks, and ships, a fact which at first sight might suggest contagion; and indeed overcrowding has been looked upon as one of the chief causes of beri-beri, but overcrowding has been removed in prisons and asylums without any definite improvement. Sometimes beri-beri has broken out in old insanitary buildings and in wretched mercantile ships, but just as numerous are the examples of outbreaks in new buildings and modern battleships apparently under the best hygienic conditions. In many cases the disease has persisted after the temporary removal not only of those attacked, but of all inmates or crews and after the most rigorous disinfection.

The persistency of the disease in collective dwellings notwithstanding the most careful disinfection, suggests the idea that beri-beri might be a place disease. But there are facts which oppose this theory. For instance, in April, 1894, 250 Japanese coolies were imported to a sugar plantation at Labosa in Fiji. Beri-beri had never occurred before in this The Japanese were placed on an outlying plantation where Indian coolies were also employed. The dwelling houses were especially built for them. One month after arrival, beri-beri broke out, and by the second week in November 219 out of the 250 had contracted the disease. In February, 1895, the 181 survivors were sent back to Japan. Many of these Japanese coolies had, previous to immigration, suffered from beri-beri. On the repatriation of the Japanese, their houses, after disinfection, were divided into separate compartments and occupied by

Indians, yet no cases of beri-beri followed.

To explain the peculiar features of the endemicity of beri-beri some authors have suggested that possibly the disease agent is spread by insects or other animals living in contact with man. Some have incriminated fleas, others lice, others mosquitoes. Van der Scheer accused the common cockroach (Blatta orientalis), which is found in all parts of the tropics, dwells in houses and ships, visits the larder and the latrine.

Beri-beri is a disease of the utmost scientific interest

and of great economic importance, and therefore it was very properly chosen as a subject for discussion; but I fear that academic disquisition will not advance very much our knowledge of its etiology. What is needed is thorough local investigation by competent men.

Without a definite knowledge of the cause of beriberi it is, of course, impossible to formulate strict prophylactic rules. However, I think we might suggest, on the experience so far collected, the follow-

ing provisional measures:-

(1) Men who have recently suffered from beri-beri should not be allowed to join coolie gangs, because they would most probably suffer from a relapse of the disease and possibly become a source of infection to others.

(2) Patients suffering from beri-beri should be isolated in beri-beri countries, because, under certain as yet undetermined conditions, they are undoubtedly a cause of further infection.

(3) Open wounds, ulcers, and abrasions of any kind should be most carefully cleansed and dressed in those who are obliged to associate with beri-beri patients.

(4) The diet supplied to coolie gangs and to the inmates of collective dwellings should be varied and rich in nitrogenous ingredients. The rice should be of good quality, recently decorticated, properly stored, carefully washed, and thoroughly cooked.

Whatever may be the cause of beri-beri, we cannot deny that diet seems to have a potent influence on its prevalence. Takaki's dietetic reforms in the Japanese navy to overcome beri-beri have proved as great a triumph as those introduced by Blane into the English navy in 1795 to combat scurvy—a disease in many ways comparable to beri-beri.

# ENTERIC FEVER IN SIERRA LEONE—NOT YET ENDEMIC?

WITH A NOTE ON A CASE OF INFECTION THREE MONTHS AFTER CONTACT.

By MAJOR F. SMITH, R.A.M.C.

Sierra Leone.

ENTERIC fever has not been generally regarded as a Sierra Leone disease, and, as a matter of fact, it is very rare indeed. The object of this paper is to record the fact that enteric is among us, to moot the question as to whether it is a new thing or not, and to point out a danger which overhangs us in the shape of an extension of the disease. Our insanitary surroundings are likely to conduce to its establishment in Freetown. The city contains some 40,000 inhabitants spread over a large area, and the place is honeycombed with unsteined wells and cesspits, the latter generally at a higher level than the former, and within twelve yards' distance. A great part of the inhabitants do not yet use any common water supply. These conditions are more likely to bring about an endemic state than to give rise to a sudden extensive epidemic.

It seems an extraordinary thing that enteric has

not been more common in Sierra Leone considering that there is nothing to prevent it from travelling from the north of Africa, where it is common, or from South Africa, where it has played such havoc with our soldiers.

Malaria has, however, been hitherto regarded as almost our only fever, and the facts seem to justify this view. The absence of records of enteric cannot be looked upon as being to any great extent due to cases having escaped the notice of medical men. We have had skilful physicians here since the early part of last century, men with experience of diseases of other countries, and they are not likely to have all of them overlooked the existence of a malady having such marked characteristics. No doubt many like myself have been on the look-out for it.

The following is a list of all the causes and suspected cases I have heard of:—

LIST OF CASES OF ENTERIC FEVER AND SUSPECTED CASES IN SIERRA LEONE FROM REMOTE TIMES TO MAY, 1902.

No. of Case	Date or Approximate Date	Remarks
1	1892	Negro soldier of the West India Regiment at Tower Hill. Died three weeks after arrival in the country. Probably con- tracted disease elsewhere.
2	Dec., 1898	Case not returned as enteric, but came under my care towards end of attack, and I suspected enteric (European).
3	Late in 1899	Native negro soldier reported by Dr. Horrocks, and verified post mortem at Panguma, far away in the hinterland.
4	1900	Case landed from a man-of-war. Died a few days later in the Colonial Nursing Home.
5 & 6	"	Dr. Renner informs me that he had two suspicious cases among the European residents.
7	2nd quarter of 1901	A West Indian negro woman in Freetown, Two attacks of hæmorrhage. Brought to my notice by Dr. Latchmore.
8	2nd quarter of 1901	West Indian negro soldier in Tower Hill Barracks. Verified at necropsy.
9	Dec., 1901	A suspected case in a Freetown native.
10	Jan., 1902	Ditto.
11	Feb., ,,	) m
12	,, ,,	Three native children living in one house
13	,, ,,	at Freetown.

The diagnosis in Cases 11 and 12 is strengthened by the fact that the dried blood examined by Professor A. E. Wright in the laboratory of the Army Medical School at Netley gave positive reaction in the agglutination test.

Eight of the 13 cases, namely, Nos. 2 and 7 to 13 came under my personal observation. Though there is no definite evidence of any connection of these cases one with another, the sequence of occurrence is such as to suggest relationship between Nos. 2 and 3, also between No. 7 and all those which followed except No. 8.

Case No. 2 was in a man who had recently arrived from Egypt, where enteric was rife. He was taken ill almost immediately after arrival in this country, and while on service in the hinterland. He was brought down through Panguma, and stayed there

two days in quarters in the barrack enclosure, in which Case No. 3 occurred a few months later.

Case No. 7 is dealt with below, but of those which followed No. 8 was in a soldier in isolated barracks on a hill, and was most likely connected with the arrival early in 1901 of some comrades who came from St. Helena in the same ship which brought the case No. 7.

The remainder occurred on the same side of the town as No. 7, but the houses were by no means near and there was no common water supply. It is probable, though, that the clothing was washed in the same stream. Dirty clothes in Sierra Leone are "taken to the brook" and washed in the pools which in the dry season are more or less stagnant, but communicate by rivulets of running water—hot water is never used by our washerwomen. These cases, might, of course, have arisen out of Nos. 2, 4, 5 or 6; or, again, out of unrecognised cases from the hinterland.

Case No. 7 bears on the question as to whether or no enteric fever is always waterborne. The woman was in St. Helena with her husband; she came to Sierra Leone in the middle of January on a transport which had carried soldiers and Boer prisoners from South Africa. Towards the end of the following April she developed enteric fever. Her husband, who came with her, had not been ill, neither had her only child or any one connected with the family. The woman was in lodgings in the town, where, as before stated, the disease is almost unknown. No local source of infection could be discovered.

There is little doubt that in this case the germs of infection came from St. Helena or the transport. The assumption, then, is that the infection was carried about on the person or belongings of the woman or some member of her family for some weeks before it found its way into her system.

It will be gathered from the remarks on the other cases that there is no certainty about the origin of this case No. 7; but the rarity of the disease in Sierra Leone, and the absence of evidence of other cases occurring in or near the house before this West Indian woman was attacked, together with the important point that she had recently come from an infected place, is strongly in favour of the theory that she brought the bacillus with her.

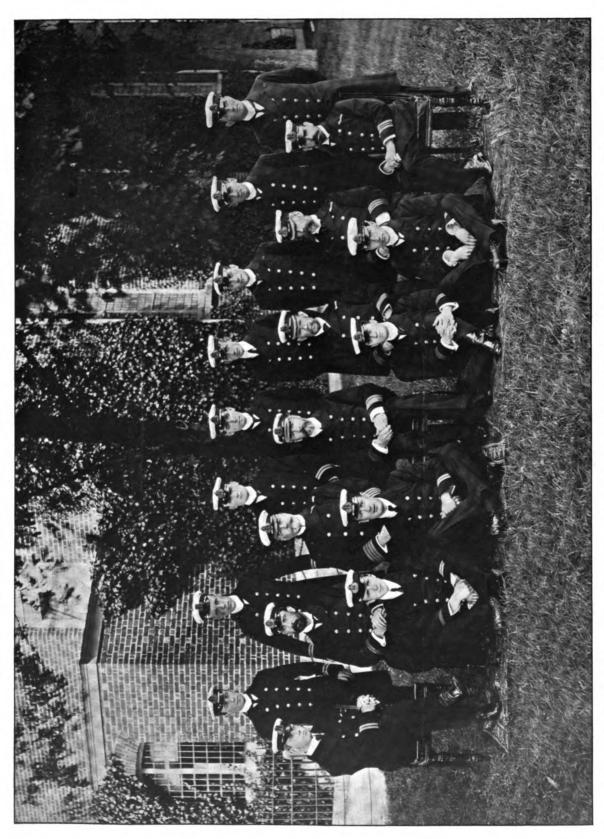
The serious fact in any case is that we have enteric fever in Sierra Leone; and it is well that all should know it in good time. Our climate is bad enough already, without the addition of typhoid to our burdens.

STATISTICS OF THE BLOOD EXAMINATION IN CASES OF MALARIA IN CYPRUS DUR-ING A PERIOD OF TWELVE MONTHS.

> By George A. Williamson, M.A., M.D.Aberd., Colonial Medical Service, Cyprus.

"MALARIA is therefore a local phenomenon which must be studied on the spot, and the data gathered in any particular territory cannot be generalised or applied to all countries." Such is the opinion expressed by the Italian authority, Professor Celli.<sup>1</sup>

# STAFF OF HASLAR HOSPITAL AND THE JUNIOR OFFICERS ATTENDING THE COURSE OF INSTRUCTION DURING THE TERM ENDING OCTOBER, 1902.



Hospital Staff :- Surgeon F. A. Capps Surgeon G. T. Bishop Dep. Insp. General James Porter, C.B. Insp. General R. W. Coppinger Fleet-Surgeon Bilbert Kirker Fleet-Surgeon W. Tait Staff-Surgeon P. W. Bassett-Smith Surgeon R. L. Jones Surgeon W. B. Maurice Surgeon C. A. G. Phipps\* Surgeon R. H. Atkins Surgeon W. R. Harrison Surgeon F. E. Bolton Surgeon C. K. Bushe Surgeon H. C. Arathoon (Hospital Staff) Surgeon J. A. Thompson

+ Silver Medallist.

\* Gold Medallist.

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If, however, there were available statistics for each territory or locality, a general malaria map might be constructed, which, besides being deeply interesting as showing the types of fever peculiar to the several places, would be of great use for commercial and other bodies in enabling them to more accurately gauge the risks to which their employés in such regions would be exposed from this, the commonest disease of hot climates.

One hears frequently the terms coast fever, West Indian fever, Roman fever, Cyprus fever, &c., employed, as though they were entirely separate diseases instead of being, as they are, malarial fevers, the difference between them depending on the variety of malarial parasite causing the greatest number of cases or the most striking class of cases; thus the parasite occurring almost exclusively in malaria in some parts of Sierra Leone was found to be the hæmomenas præcose. Statistics such as those following, if available for our different colonies, would help to a more intelligent understanding of the real meaning of such terms as those mentioned.

#### FREQUENCY OF THE PARASITES.

These statistics are the results of careful microscopical examination of the blood in all cases of illness where the symptoms at all resembled those of malaria, and extend over a period dating from February 1st, 1901, to January 31st, 1902.

#### TABLE I.

Number of cases examined for parasites		 729
Number of cases diagnosed as malaria		 503
Number of cases in which parasites were	found	470

Percentage of the cases diagnosed as malaria, in which parasites were found, equals 94 4 per cent.

Davidson<sup>2</sup> says that Laveran in Algeria found parasites in 432 out of 480 cases examined, and that Osler, Councilman, and James in the United States found them in from 90 to 100 per cent. of their cases—results much the same as those on which the present remarks are based.

#### THE MALARIAL SEASON.

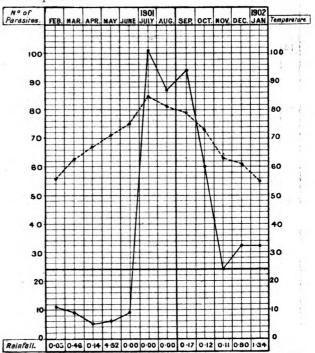
In Table II are given, for the different months, figures showing the number of cases in which malarial parasites were found, and from this it is at once evident that the malarial season is the second half of the year.

Table II.—Showing for the Several Months the Number of Cases in which Malarial Parasites were Found.

Date.			Cases.
February, 1901	 	 	11
March, 1901	 	 	9
April, 1901	 	 	5
May, 1901	 	 	6
June, 1901	 	 	9
July, 1901	 	 	101
August, 1901	 	 	87
September, 1901	 	 	94
October, 1901	 	 	60
November, 1901	 	 	24
December, 1901	 	 	32
January, 1902	 	 	32

The same figures are used in the construction of chart A, which shows in a most striking way the seasonal prevalence. The greatest number of cases

occur in July, and from then on to November there is a gradual drop, followed, strange to say, by a slight rise in December and January. This rise is not usual in Cyprus, and is perhaps to be ascribed to a downpour of rain at the end of September, followed by a long period of dry weather, thus affording an opportunity for the breeding of mosquitoes in the pools left; and, in fact, the number of mosquitoes to be found through the winter up to January was very generally commented on in the district as being quite unusual; it is generally held here that the heavy rains, which as a rule fall in October and November, scour out the pools and wash away the larvæ, but in 1901 there was no continuance of heavy rains to act in this way, and the one downpour in the end of September merely supplied the necessary pools for the development of the mosquitoes.



A.—Chart showing (1) number of malarial parasites, (2) mean atmospheric temperature, and (3) rainfall, for twelve months, from February, 1901, to January, 1902. Black line, number of parasites; dotted lines, temperature.

Chart A shows the rainfall in inches during the twelve months, and it will be seen that the very small amount of rain falling on the earth makes any connection between annual rainfall and malaria incidence difficult to show. The average rainfall for Cyprus is about 12 inches, but in Larnaca during the twelve months in question it was only 7.8 inch.

So far, the following propositions may be hazarded:

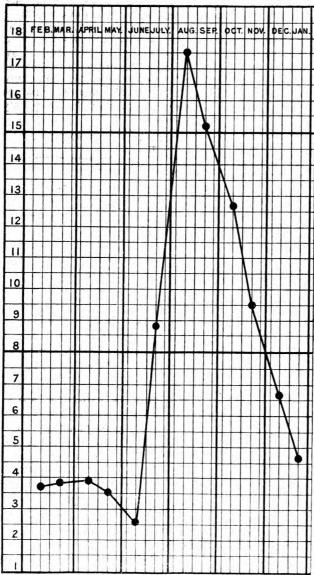
(1) That in years with a small winter, and more especially spring, rainfall, the summer malaria prevalence will be low.

(2) That in years with a great winter, and more especially spring, rainfall, the summer malaria prevalence will be high.

(3) That with frequent and severe autumn and early winter rain, the winter malaria prevalence will be very low indeed.

(4) That with late summer rain followed by autumn and early winter drought, the winter malaria prevalence will be, for the season, high.

During this present summer the mosquitoes have so far been much fewer than usual, apparently owing to the absence of spring rain to form breeding pools, and malaria has been later than usual in appearing in



B.—Chart, compiled from the published statistics of Professor Celli, showing the number of cases of malarial fever observed monthly, in the hospitals of Rome, for the years 1864, 1865, 1873, 1874, 1877, 1878, 1892, 1893, 1894, 1895, 1896, 1897, 1898. Each division represents 1,000 cases, and the total number of cases for the whole period amounts to 93,000.

#### COMPARISON WITH CELLI'S STATISTICS.

Chart B is compiled from figures given by Celli.<sup>3</sup> The general curve is very much the same as that for Cyprus for 1901; in both the fact that it is the second half of the year that is malarial rather than the first is clearly brought out, and this concurrence, con-

sidering the geographical position and meteorological conditions, is what might be looked for.

# MALARIAL PREVALENCE AND ATMOSPHERIC TEMPERATURE.

Reference to Chart A shows that there is a certain likeness in the two curves, that of malaria and of the mean monthly temperature. The three months when most fever cases occurred were July, August, and September, and these were the three hottest months also, and were the three months during which (with the exception of a downpour on September 30th) no rain fell. These circumstances go to show the truth of Celli's remark that malaria is a local phenomenon, as will be more clearly brought out if we compare these results with those given in the Report of the Malaria Expedition to West Africa, with reference to malarial admissions among the troops in Sierra Leone; there the greatest number of admissions were stated to occur during June, July, and August, the three rainiest months being July, August and September, these months being also the coolest.

In this connection it is interesting to note that the mosquitoes do not here hatch out in numbers until April, and it has struck me that Anopheles hatch out at a slightly later date than Culex—this fact, dependent probably on atmospheric temperature, would tend to explain the seasonal incidence of malaria. The fever season in Algeria appears to be much the same as in Cyprus, occurring as it does during July, August, September, which, with June, are also the months with least rainfall.

# SEASONAL PREVALENCE OF THE DIFFERENT VARIETIES OF MALARIA.

Chart C gives the curve for tertian, quartan and estivo-autumnal fevers respectively, and is compiled from the same figures as Chart A, the different varieties of parasites found being separated.

From this the tertian is seen to be an earlier form than æstivo-autumnal, its greatest prevalence occurring in July, whereas the greatest prevalence of æstivo-autumnal occurs in September—in fact, tertian is an early summer and æstivo-autumnal a late summer fever—both, however, declining rapidly from September onwards, a slight rise of æstivo-autumnal making its appearance in January, this slight rise is evident in both Charts A and C, and an attempt at its explanation has already been given.

The cases of quartan are so few in comparison to the others that the curve is of little value—it would, however, point to quartan being here, as elsewhere, a cold weather form of malaria—it is to be noted that cases were met with throughout the whole year.

The percentage of the different varieties, with reference to the total number found, works out as follows:—

Tertian			 	 48.46
Quartan			 	 8.03
Æstivo-at	ıtumı	al	 	 43.50
				100:00

This percentage prevalence very closely agrees with that given by Davidson 6 as applying to Vienna:

No. of Cases	Quartan	Tertian	Qnotidian	Irregular
3,126	7.8	47.8	41.3	3.0

His figures for India, Algeria and Sweden vary very largely from these, showing a decrease in the quartan and tertian, and an increase in the quotidian as the colder climates are changed for the warmer.

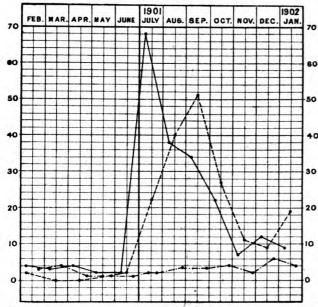


Chart showing, monthly, the number of parasites of (1) (2) quartan, and (3) æstivo-autumnal malarial fevers, from February, 1901, to January, 1902. Black line, tertian; dash and dotted lines, quartan; dash line, æstivo-autumnal.

#### MULTIPLE INFECTION.

The following table (No. III.) shows the total number of cases of tertian and quartan during the twelve months, and also the proportion of cases that were of double or triple infection. From this it is evident that the multiple infection in tertian fever is most marked during the season of greatest malaria prevalence, which, as we have seen, is also the season of greatest heat.
With regard to quartan the frequency of triple

quartan (which without microscopical examination of the blood would possibly be diagnosed as quotidian) is somewhat striking.

#### MIXED INFECTION.

Several cases of mixed infection, the parasites being those of tertian and of æstivo-autumnal fever, were met with, but their order with reference to date of infection could not be made out.

No cases of hæmoglobinuric fever have ever come under my notice during a seven years' residence in the island, and I have had no case under quinine treatment where this drug caused hæmaturia.

#### TREATMENT.

The interest attaching to the recent discussion in the British Medical Journal with reference to the hypodermic injection of quinine as a treatment of malaria makes me digress from the subject proper of this article to say a word in this connection. quinine in solution, and given by the mouth, has been my usual method of treatment, I have, in cases specially resistant to quinine in this form, or where head symptoms were prominent, used the acid hydrochloride of quinine hypodermically, or rather intra-muscularly—the smallest dose given for an adult has been 3 gr. night and morning for three days, six doses in all; the largest single dose given in any case was 10 gr.; the usual dose given was 5 gr. night and morning for three days; the results have been most satisfactory. My experience has been that quinine given in this form does not upset digestion nor cause cinchonism, as when given by the mouth, while its specific action is more readily and completely obtained.

TABLE III.—SHOWING TERTIAN AND QUARTAN MULTIPLE INFECTIONS.

	TER	TIAN	QUARTAN				
	Total No. of Cases	Double Tertian	Total No. of Cases	Double Quartan	Triple Quartan		
1901.				1			
February	4	-	3	_	1		
March	3	_	4	-	2		
April	4	2	1	_	1		
May	4 2	-	1	1	-		
June	2	2	1	_	1		
July	68	48	2		1		
August	38	20	3		1		
September	34	21	3	2			
October	22	8	4	_	_		
November	7	2	2		_		
December 1902.	12	4	6	4	1		
January	9	-	4	-	-		
Total	205	107	34	7	8		

#### ANOPHELES.

Anopheles occur and have been found at many places in the island, and are most plentiful in the most malarious parts. Some specimens were sent to Dr. Daniels, who very kindly undertook to have them identified. They were found to be Anopheles maculipennis, and this is certainly the commonest species here. I have also seen a smaller and darker coloured Anopheles, but do not know to which species it belongs.

I trust that these statistics, meagre as they are, and covering as they do only a short period, may be of some use and interest with reference to malaria in Cyprus.

#### REFERENCES.

¹ Malaria according to the New Researches. By Professor Angelo Celli. Translated by J. J. Eyre, M.R.C.P., p. 157. ² Hygiene and Diseases of Warm Climates. By Andrew Davidson, M.D., p. 121. ³ Op. cit., p. 149. ¹ Report of the Malaria Expedition to West Africa, August, 1899. Liverpool School of Tropical Medicine, p. 6. ¹ Davidson, op. cit., p. 139. ¹ Davidson, op. cit., p. 137. ¹ British Medical Journal, May 3rd, 1902. p. 1113.

#### EGYPTIAN MEDICAL CONGRESS.

THE following gentlemen have kindly consented to join the Committee in England on behalf of the Egyptian Medical Congress, which will be held at Cairo on December 19th-23rd next. Special facilities and reduction in fares are arranged for members wishing to be present at the Congress. Anyone wishing for further information will please apply to any member of the Committee, or to the Hon. Secretary, 9, Manchester Square, London.

List of the Committee: Sir Lauder Brunton, Mr. Watson Cheyne, Sir William Church, Bart., Mr. Reginald Harrison, Sir Victor Horsley, Dr. Stephen Mackenzie, Dr. Page May (Hon. Sec.), Sir Douglas Powell, Bart., Dr. George Savage, Sir Thomas Smith, Bart., Dr. James Taylor, and Sir Frederick Treves,

Bart.

# The British Guiana Medical Annual for 1902.

# ANKYLOSTOMIASIS; IS PIGMENTATION OF THE TONGUE AN EARLY SIGN?

By P. H. DELAMERE, L.R.C.P.I.

THE early diagnosis of this grave and fatal disease being of such vital importance to both the employer of East Indian labour and the medical officer in charge, any new or hitherto unrecognised sign of early disease will, I feel certain, be of special interest. This is therefore my reason for bringing before the medical profession a symptom which I believe to be an early sign of ankylostomiasis.

Every writer on ankylostomiasis lays stress on the importance of early diagnosis, to quote Manson's "Tropical Diseases" only, he says, "Provided its presence be suspected ankylostomiasis is easily diagnosed."

"In tropical countries anamia without apparent cause should always suggest a microscopical examination of the fæces." But I think I have found an earlier sign, viz., before that of anamia, and it is with the hope of producing investigation, and proving or disproving the theory, that I place before the readers of this journal this short paper. If I am correct, then it is a very easy diagnosis and one that can be made at once and anywhere.

Every day that an immigrant is in hospital there is a distinct loss both to the estate that employs him and to the immigrant himself, and in these hard times it becomes a burden, when say on any one estate ten to twenty labourers are in hospital for weeks or even months at a time from this disease. The loss becomes heavy, the man loses a shilling a day, and the estate another shilling or more; and when this is multiplied by the daily loss all over the Colony the figures made up will be found to be very great.

It therefore becomes a most urgent question to save some of this loss at any rate, and as every one will agree that: (1) ankylostomiasis is the cause of a large number of detentions in hospital; (2) in its early stages it is certainly curable. It is idle to say therefore that an early sign of this grave disease would not be of the utmost value to every one concerned.

Some few months back I one day in examining

a patient noted that his tongue was marked all down one side just as if he had wiped a penful of Stephen's blue-black ink on it; I chided this man for playing with the pens and ink that were on the ward table. He assured me he had never touched them, and on further examination I found that they were not ink stains. He said his tongue had been marked like that for a long time; now this man was not anæmic even to a slight degree, came in for slight fever, his organs were healthy, there was no outward sign of ankylostomiasis. Now in cases like this, one does not (or shall I say did not then), examine the fæces for more than one reason easily understood. This man got over his fever and was discharged. Shortly after another case came in, anæmic and with large blue-black marks on the tongue; his general appearance gave me the idea that he had ankylostomiasis. Not having a microscope I treated him on chance with thymol in the usual way, as suggested in a recent circular on the subject from the Surgeon-General, and on having the stools examined after thymol several ankylostomes were found and shown to me. I then connected the two cases, got my former patient back, and he, also, after treatment with thymol passed ankylostomes. After that I looked at every tongue I came across, and at one monthly inspection found no less than fourteen marked tongues, some with only two or three very small blue-black marks less than a sixteenth of an inch, and of irregular shape, some like little islands of blueblack in the centre of a perfectly healthy-looking tongue, others with a strip down one side of blueblack, and all in perfectly healthy non-malarial first year's coolies. They were all treated with thymol and every one passed matured ankylostomes, and on further treatment left the hospital with the marks removed (I find that the marks after thymol treatment begin to fade at the edge and gradually lose colour, getting paler till they fade away). Later on I found three cases that had brown marks on the tongue, in two minute coffee-coloured spots at tip, and the other a large coffee-coloured mark on the side of the tongue with minute dark brown spots in it. These also after thymol passed ankylostomes, but the patients were anæmic when first seen.

Now if these cases mentioned had been allowed to go on till symptoms of anemia showed, the patients would have been in a more advanced stage of the disease; as I hold that they were suffering from ankylostomiasis, they all having passed ankylostomes, and consequently taken twice or three times as long curing, and twice or three times as great a loss to the estate, or been past curing and become candidates for that gang of much to be regretted "invalids" that one finds on every estate, useless and expensive to the estate, and a continued source of trouble to the Medical Officer and Immigration Agent.

I have been told on making known this theory that the marks are caused by malaria, and not by the ankylostome. Of course malaria is much more common than ankylostomiasis. There were 843 cases of malaria treated in the estate hospital under my charge during 1901-2, besides a greater number as out-patients. Now if malaria causes this marking, one should find many more cases of it than I have come across. Thirty-eight were treated in hospital,

and several seen in private practice, and is it not strange that if this is not a sign of ankylostomiasis, each one of my freshly-imported, healthy-looking, and certainly non-malarial cases, should have passed ankylostomes after thymol. That malaria does mark the tongue I know, but I have only found it in advanced cases of malarial cachexia, not in strong, healthy adults with no sign of disease about them; if it does, then I should have found hundreds of cases by this time.

Daniels found on microscopic examination that there was a distinct pigmentation of liver, kidney, and sometimes spleen caused by the ankylostomes (B. G. Annual, 1895, p. 21) which was not malarial. Now if malaria causes a pigmentation of spleen, &c., as well as of the tongue, why should not the toxic substance which he believes is produced by the ankylostome, and absorbed from the bowel, causing blood destruction, produce pigmentation of the tongue, as well as of

liver, &c.

In another way it becomes an important sign; the early symptoms of this disease, before anæmia shows itself, as laid down in the works on the subject, are dyspeptic troubles and pain or uneasiness in the epigastrium. Now with a class of patients such as one usually sees in an Estate hospital, it is anything but an easy matter to get an intelligent history of symptoms; there is first the language difficulty, and if the patient speaks any English "a pain in me bellie" may mean anything, and "a cross pain," &c., will not help, but until the anæmia puts you on the track, there is little to point to the presence of ankylostomes, unless everyone's stools are examined, which though giving big results takes time, but with a blueblack or brown mark on the tongue one is on the track right away, and can hardly help being aware of the patient's state, without even asking for symptoms. The patients do not look or feel ill, but there is the sign of this grave disease lurking in their system, which if not treated will shortly make them useless and expensive members of the community.

That the disease is on the increase in this island I am quite certain, as not only have I seen it in the Estate hospitals, but I have seen many cases in my

private practice.

# Current Literature.

The Treatment of Pernicious Forms of Malarial Fever.—Professor Montoro de Francesko, as the result of observations of certain severe forms of malaria in Calabria, Italy, which occur chiefly in summer and in autumn, advocates hypodermic injections of quinine. He remarks that the temperature will often rise after repeated small doses of quinine. In severe types of malaria, Professor Francesko advises that 30 grains of the dihydrochlorate of quinine should be administered hypodermically to begin with, and then 16 grains daily until the patient has been free from fever for three or four days. Afterwards 16 grains of euquinine should be given internally every day for one month. Francesko advocates and prefers euquinine owing to its tastelessness, and that no unpleasant symptoms result

from its use. In the case of children equinine is especially valuable.—*Klin-therap*. Woch., 1902, Nos. 23-25.

ANKYLOSTOMIASIS IN AN INDIVIDUAL PRESENTING ALL OF THE TYPICAL SYMPTOMS OF PELLAGRA.-H. F. Harris reports this interesting case. The patient, a man, aged 29, lives in Georgia. He has been brough up in great poverty. His bread has always been prepared from Indian corn, which has formed the greater part of his diet. The first symptoms usually begin in the spring with loss of appetite, thirst, and a feeling of malaise. He suffers from melancholia. His legs become extremely weak, and sensation to pain is far below normal. In the spring his hands, arms, and the dorsal surfaces of his feet become greatly inflamed. Blisters form, followed by scabs. He suffers from constipation, and has a great distaste for food, especially for Indian-corn bread. During these periods he has constant pain in the neck and tenderness and pain in the gastric region. He vomits frequently. He begins to improve after May or June, and by July or August is generally well again. The patient has all of the typical symptoms of pellagra. If this is a genuine example of the disease, it is the first case of the kind that has been reported in the United States. In the man's fæces, numerous eggs of the ankylostoma have been found, and it seems not unlikely that the pathologic condition is in large measure due to this cause; but, on the other hand, there are certain features that are not consistent with this explanation, such as the strange tendency of the disease to manifest itself only in the spring and early summer, and the fact that it has existed for fourteen years. These parasites are said not to live in the body for more than five or eight years at the very outside, and unless the patient has been repeatedly re-infected, the presence of these parasites cannot entirely explain the long duration of the disease. Thymol was recently given to the patient, and not less than 600 worms passed from the bowels. No eggs of the ankylostoma were found four weeks after the treatment. The patient, however, is now feeling no better than before. If he had pellagra, the disease is so far advanced that nothing probably could be done for him. He has been advised to go to a cooler climate, and to be careful not to eat decomposed Indian corn. It should be noted that the posed Indian corn. It should be noted that the blood examination showed the hæmoglobin to be only 20 per cent., the red cells 1,760,000, and the white cells 4,020; there was decided poikilocytosis.—American Medicine, June 19th, 1902.

#### PLAGUE.

India.—During the weeks ending September 27th and October 4th, the deaths from plague in India number 9,976 and 10,718 respectively. The mortality during the latter week occurred as follows: Bombay City, 101; Presidency, 7,780 Karachi, 23; Madras, 385; Calcutta, 9; Bengal, 52; United Provinces, 736; Punjab, 210; Central Provinces, 2; Mysore, 1,122; Hyderabad, 149; Berar, 148; and Central India, 1.

EGYPT.—During the week ending October 12th, one fresh case of plague was reported in Alexandria. Since October 10th Egypt has been entirely free of plague.

Clinical Journal.

MAURITIUS.—During the week ending October 23rd, 17 fresh cases of plague and 11 deaths from the disease were recorded in Mauritius. During the week ending October 30th, there occurred 29 cases of plague and 16 deaths from the disease.

Hong Kong.—One case of plague only was notified in Hong Kong during the week ending October 25th.

Russia.—Since the recurrence of plague in Odessa, in May, 1902, 15 deaths from plague only have been recorded. The Russian authorities are taking extraordinary precautions against the spread of the

PALESTINE.—During the week ending November 1st, 494 deaths from plague occurred at Gaza and the neighbouring villages, 78 at Lydda, and 5 at Jaffa.

#### CHOLERA.

EGYPT.—During the week ending October 13th, 819 cases of cholera occurred in Egypt against 1,571 during the previous week. During the week ending October 20th, 685 cases were reported.

Syria.—For ten days previous to October 18th, 40 deaths from cholera were stated to have occurred in Syria.

LEPROSY: Possible Sources of Contagion .-Gravaqua has found the bacillus of leprosy on the surface of leprous lesions, both recent and healed, and on gold coins which have been handled by lepers. -Journ. de Mal. Art. et Syph., January, 1902.

BLACKWATER FEVER IN THE PHILIPPINES .- In the New York Medical Journal of September 13th, 1902, Dr. F. M. Hartsock describes the clinical symptoms and the post-morten signs of what appears to be a typical case of blackwater fever occurring in Manila.

#### BIRTH.

On September 19th, the wife of Professor W. J. Simpson, M.D., F.R.C.P., of a daughter.

#### EXCHANGES.

Archiv für Schiffs u. Tropen Hygiene. Archives de Medicine Navale. Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie. Australasian Medical Gazette. Boletin de Medicina Naval. Boston Medical and Surgical Journal. Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology. British Medical Journal. Brooklyn Medical Journal. Caducée. Climate.

Annali di Medicina Navale.

Clinical Review. Giornale Medico del R. Esercito. Hong Kong Telegraph. Il Policlinico. Indian Engineering. Indian Medical Gazette. Indian Medical Record. Janus. Journal of Balneology and Climatology. Journal of Laryngology and Otology. Journal of the American Medical Association. La Grèce Médicale. Lancet. Liverpool Medico-Chirurgical Journal. Medical Brief. Medical Missionary Journal. Medical Record. Medical Review. Merck's Archives. New York Medical Journal. New York Post-Graduate. Pacific Medical Journal. Polyclinic. Public Health. Revista de Medicina Tropical. Revista Medica de S. Paulo. Sei-i-Kwai Medical Journal. The Hospital. The Northumberland and Durham Medical Journal. Treatment.

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# The Journal of Tropical Medicine.

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### Original Communications.

NOTES OF A TOUR IN THE NORTH CANARA DISTRICT OF INDIA IN SEARCH OF MOSQUITOES.

By E. H. AITKEN.

(Continued from p. 327, November 1st, 1902.)

It remains to give some account of the mosquitoes collected during the tour. I have already referred to the difficulties arising from limited time, rapid travelling, and the want of conveniences for rearing and watching larvæ of many different species at one time. These hampered me so much that I was able to rear only a very few specimens of each species and lost some altogether, so the collection I brought back with me numbered only forty-eight specimens belonging to thirteen or fourteen species. I had preserved the larvæ of five of these and of course kept notes, the substance

of which I give below.

To begin with Anopheles, to which the other genera owe all the interest that they have recently excited, I obtained six species, three of which I identified as A. rossii, A. barbirostris and A. christophersi. The fourth is a species allied to A. Jamesii (Theobald). It is probably the African species A. maculipalpis (Giles). The fifth is, I think, a new species allied to A. maculata (Theobald). The sixth was a minute species with unspotted wings. All these were bred, and of course it was my first object to learn as much as I could about the life of each in its earlier stages. To this end the first step was to learn to distinguish the larvæ at sight if possible. The best method to attain this skill is to put your larvæ into shallow vessels (white saucers do well), and stare hard at them by the hour until you come to recognise them, as you recognise a friend when he is too far off for his features to be distinguishable. I was soon able to divide my larvæ into three groups, readily distinguishable from each

as the front of the thorax, so that the two together

other, which I will call the rossii, christophersi and

barbirostris groups. A. rossii is the commonest species in Bombay, and its larva was already very familiar to me, so I will take it as the standard of

comparison. It is not only the commonest but also

the easiest to find, always on the surface, darting about backwards, and snapping at its neighbours. It

does dive, of course, when threatened, but comes up

again very soon. When young it is brown, with a blackish head and a white collar. When full grown

the colour is variable, light brown, almost black, or greenish, the head being generally mottled brown.

Just before becoming a pupa it turns pale and looks

very fat and smooth; at this stage I have taken it for a different species. The larva of A. barbirostris is markedly different. It is usually very dark in colour,

with a light collar and a light band at the third

abdominal segment, most prominent in the young.

Sometimes there is a broad silvery, dorsal stripe; but colour is a very unsafe guide. Form and habitual atti-

tude can be trusted, and, in the case of barbirostris, serve to distinguish it almost at a glance from all larvæ of the rossii type. The thorax is small, scarcely exceeding the head in breadth, the head is elongated, and the abdominal segments are nearly equal, so that the insect looks long and worm-like when compared with the larvæ of rossii. This appearance is enhanced by its attitudes, which are less rigid, even when it is floating at rest. When browsing on confervæ, which appear to be its principal food, it lies like a snake. It appears to feed very little on the surface. I found this species in a rocky pool in one stream and among dense grass and weeds in another.

The larva of A. christophersi differs as markedly from that of rossii, but the differences take just the opposite direction. The head and thorax are broad, the abdominal segments decrease rapidly from the first to the last and are very sharply defined. The lateral bristles are long and stout. But the most definite mark is the shape of the thorax, which is not round or oval, but distinctly quadrilateral and broader behind than before. The back of the head is as broad

 $<sup>^{\</sup>rm I}$  This is probably the new species I am describing as A. immaculata. – F. V. Theobald.

form a rough triangle. With a little practice this becomes very readily recognisable, whether the larva is old or young. The colour is usually light greenishbrown, the head being darker. These larvæ are very alert, diving on the least alarm and lying motionless at the bottom. For catching them I found nothing equal to a white teacup of enamelled iron. If dipped adroitly it engulfs them before they have time to escape. But if any mud has been taken in with the water, it is most difficult to detect them, so patiently do they sham death. They do not seem to feed on confervæ at all. If anything of the kind is put into the water with them, they are apt to entangle themselves and die, by drowning I suppose. They feed either on the surface or at the bottom, twirling their brushes. For this reason, perhaps, they affect shallow, clean water. I found them in rice-fields and small rocky streams, but most abundantly in boggy ground adjoining rice-fields. The larva of the Anopheles with unspotted wings belongs to this type. I could distinguish the two when I saw them together, but cannot describe the difference. I obtained very few of the unspotted species, all in one pool formed by a stream in a dark forest.

The differences which I have attempted to describe in the three types of larvæ seem to correspond to differences just as marked in the imagines. The Rossii group are typical Anopheles, Barbirostris is unique, while the Christophersi group comprises small forms more resembling Culex in their outline

and habitual attitude.

Of Culices other than Anopheles I got some interesting species. The commonest larva above the Ghauts was that of Culex fatigans, which I found keeping company with Anopheles everywhere. I need not describe it. Many contradictory statements have been made about the larvæ of Culex destroying those of Anopheles, and vice versá, based probably on observations made upon very different insects which have been lumped together as Culex, so I will give here the results of my own experience. I believe that the larva of C. fatigans and every other of the same type is purely vegetarian. The larvæ of A. rossii feed greedily on the dead bodies of their own species, and I am almost certain that they will kill and devour weak or sickly individuals; but the larvæ of C. fatigans live as amicably together as a flock of sheep, There is, however, another mosquito, strangely like C. fatigans at first sight, but twice as large, the larva of which is very different both in aspect and temper. It is a creature of rather striking appearance. The head is brown, but the body is usually of a transparent white colour, except the posterior half of the thorax, the third, sixth and last segments of the abdomen and a central line, which are of a rich brown hue. It floats horizontally, but of course not at the surface, the breathing tube being moderately long. This creature feeds, as far as I have seen, exclusively on other larvæ, catching them by any part and chewing them up, undisturbed by their wrigglings. I fed mine on Culex and Anopheles, but they devoured each other also till there were only two monsters of equal size left, which produced fine female mosquitoes. I got more afterwards. I found this species, with other

larvæ, in grassy pools, and once in a very deep well. I have also taken them from a well in Bombay. As might be inferred from its habits, this larva differs in many points from that of a typical Culex. The most obvious difference, and one that can be seen with the naked eye, is in the antennæ. Those of C. fatigans are long and tufted at the ends and, standing out like the jaws of a stag beetle, give the insect a fierce aspect. In the larvæ I am describing they are as short as in Anopheles and must be looked for with a lens. The jaws are formidable, and the brushes, which are large and consist of very stout bristles combed at the inner edge, do not overhang the mouth, but extend laterally. I never saw them in motion and their position suggests that their function may rather be to assist in holding prey. I have said that the mosquito is very like C. fatigans in form and colour, but the femora and tibiæ are speckled with yellow. I have no means of identifying it at present and must leave its name to a foot-note.1

Another rather striking larva, with banded body and very large head, which I found commonly in grassy pools along with those of Anopheles and Culex, surprised me by producing an Aedes. With its long breathing tube and large, tufted antennæ, it closely resembled C. fatigans, except in colour, but it floated horizontally, though, of course, at some distance below the surface. It appeared to feed entirely at the surface, after the manner of Anopheles. I regret that I did not examine the pupa carefully. The imago, when it came, was a minute dusky gnat, which I took for the unspotted Anopheles mentioned above until I had examined the palpi. I tried to get it to taste my blood, but in vain. Its name must be relegated to a

foot-note also.2

I reared a good many Stegomyia larvæ. I caught S. scutellaris biting one of my peons in a field in broad daylight, but did not find its larvæ. I have reared it in Bombay, however, and may say that there is little difference between the two larvæ in form or habits, in both of which they differ from Culex proper. The antennæ are short and straight, the head not so broad as the thorax, and the breathing tube short and stout. Their position when floating is nearly perpendicular. Their food consists largely of rotting leaves, and the rapidity with which some in my keeping reduced a leaf to a skeleton suggested that this might be one of the ways in which the beautiful skeleton leaves, which one often meets with in this country, are produced. Colonel Giles speaks of Stegomyia as essentially a monsoon mosquito, and so it is on the plains, where the conditions it requires are not obtainable at any other season. The ideal breeding place for this genus is a small hole in a rock, or in a hollow tree, well shaded from the sun and filled with a brew of rotting leaves the colour of beer. In Canara this can be had at any season, and I found the gloomy beds of forest streams swarming with them in March and April. They were venomous and thirsty, and having

<sup>1</sup> Rossii is not a typical Anopheles .- F. V. T.

This mosquito is Culex concolor (Desvoidy). The characteristic position assumed by the larvæ in water and their cannibal habits have been previously noted (cf. "A Monograph of the Culicidæ," by F. V. Theobald, vol. ii. p. 110).—S. P. James.

2 I have not seen this species; it is probably a new one.—

once found me they would follow me out into the

sunlight and refuse to be driven off.

I found some other curious larvæ which I did not succeed in rearing, and some mosquitoes of which I failed to get larvæ. A fine female of C. mimeticus emerged before my eyes from a pupa in a morning's "bag" which I had not yet sorted. I got only one other specimen and that I caught in a hut. I never saw a Megarrhina. I had not much leisure to look for them, and possibly they were not on the wing at that season. I was also singularly unsuccessful in getting eggs, but I did not regret this much, because in the circumstances I could not possibly have reared mosquitoes from them (a difficult thing at the best), and without doing this I could not have been sure of the species to which they belonged.

the species to which they belonged.

I will not apologise for giving no detailed and minute descriptions. I have put my collection into hands much abler for that kind of work than mine. These are field-notes merely. I will conclude by mentioning one fact which it may be worth the while of collectors to note. A mosquito does not attain its proper colour for some time after emerging from the pupa, and collectors may prepare much perplexity for themselves by being in too great haste to kill their specimens. Of two specimens otherwise alike one may have the femora and tibiæ almost white, not because it is a different species, but because it was

killed sooner.

## SLEEPING SICKNESS: A SUGGESTION.

By Alexander Crombie, M.D.Edin., C.B.

Lieut.-Col. I.M.S. (retired).

The exceeding prevalence of Filaria perstans in the blood of the inhabitants of districts where sleeping sickness is endemic, the presence of the parasite in the only three cases he had seen in England, the correspondence which obtains between the geographical distribution of the disease and that of the parasite, and the fact that the parasite may remain alive and the disease manifest itself years after the endemic area has been quitted, led Manson to suggest that the parasite was in some way responsible for the disease; though it seemed to him hard to say in what way it operates. ("Tropical Diseases," 1900, p. 286.)

It has been objected to this theory that the parasite may exist in the blood in enormous numbers without any symptoms of this or any other disease, and on the other hand, that sleeping sickness may exist and proceed to a fatal termination with few or no parasites in the blood, and that indeed towards the end of

an attack they are generally absent.

The only legitimate deduction which could be made from such data is that African lethargy is not due to a toxin elaborated by the parasite circulating in the blood like an opiate, and dependent, as regards its intensity, on and commensurate with, the degree of filarial activity present.

These cannot indeed be regarded as serious objections, because the forms of the parasite found in the blood are the embryos, and taking *Filaria nocturna* as an analogue, we may assert that the embryos are

probably not of any pathological significance. The same objections could be made to considering chyluria, or elephantiasis, to be filarial diseases; they bear no relation to the number of embryos in the blood, and indeed in elephantiasis it is exceptional to find any. These diseases are conditional on the position in the lymphatic system taken up by the parent worm and the consequent obstruction to the lymphatic flow. The parent worm, which was the original cause of the obstruction, may die, and the embryos disappear from the blood, but the effects of its operation may be permanent.

So it may be with sleeping sickness. The disease, if on all fours with chyluria and elephantiasis, would not bear any relationship to the number of embryos found in the blood, but would be determined by the position occupied by the parent worm and the mechanical difficulties which it might cause in that

position.

Hitherto, the parental forms of Filaria perstans have been found only in the connective tissue at the root of the mesentery, behind the abdominal aorta, and beneath the pericardium (Manson). It is obvious that they are incapable in these positions of giving rise mechanically to the symptoms of sleeping sickness. To do this they must be sought for elsewhere.

It would be vain to look for them in the encephalon itself. No gross lesions such as would be necessary to cause the symptoms have been found within the cranium, and moreover, localised lesions such as they would produce would be betrayed by localised and partial symptoms, which are generally absent in sleeping sickness. It may be ushered in by epileptiform seizures or maniacal attacks, but more usually it begins with listlessness, headache, giddiness, lassitude, and a tendency to somnolence, which gradually deepens; symptoms of a cause affecting the brain generally and not locally.

Mott has shown (British Medical Journal, Dec. 16th, 1899) that naked-eye abnormalities in the brain are almost nil, but microscopic sections show that the essential condition is crowding of the pia mater and perivascular spaces with mononuclear leucocytes. The perivascular spaces constitute the lymphatic system of the brain, and we must therefore conclude that as in chyluria, elephantiasis, &c., the essential condition in sleeping sickness is one affecting the

lymphatic system.

The most constant symptom in sleeping sickness, as well as in infection by Filaria perstans, with or without somnolence, is enlargement of the lymphatics, in sleeping sickness those of the neck being chiefly affected. It is said to occur in 99 per cent. of the cases. The enlargement and obstruction of the lymphatic glands of the neck would account for the fulness and puffiness of the face, which is noticed early in the disease, and also possibly for the tremors of the lips and tongue, the lymphatic vessels from these parts all ending in the superficial lymphatics of the neck, and it is probable that the parent form of the worm, or its aborted ova, will, if sought for there, be found in or around these vessels, or glands, giving rise, as in the case of Filaria nocturna, to lesions analogous to those which cause chyluria, elephantiasis, and lymph-scrotum.

But enlargement and obstruction of the superficial lymphatic glands of the neck would not affect the lymphatic flow within the cranium, and could not cause the brain symptoms which characterise sleeping The lymphatics of the brain leave the cranium through the jugular foramen, with the jugular vein, and join the upper set of the deep cervical glands which extend along the course of the internal jugular vein from the base of the skull to the level of the thyroid cartilage. Obstruction of this set of glands would cause lymph-stasis within the cranium, changes in the perivascular spaces, and probably all the phenomena of sleeping sickness. The periods of temporary abatement of the symptoms which often mark the earlier stages of the disease would correspond with periods of lessened inflammatory obstruction.

I would suggest, therefore, to those engaged in the investigation of this disease, that in every fatal case of sleeping sickness, the deep cervical glands, both the upper and lower sets, of both sides, should be carefully examined for signs of disease, as being the most likely seat, on à priori grounds, of the essential condition, probably caused by the presence of the parental form, or its aborted ova, which determines the occurrence of sleeping sickness in cases of infection by

Filaria perstans.

I venture to think that the deep cervical lymphatics are rarely examined in post-mortem researches, but the reasoning by exclusion which I have adopted seems to narrow down the cause of the symptoms to disease affecting the glands which receive the lymph from the brain, as the only ones whose obstruction would presumably give rise to the phenomena of sleeping sickness I offer the suggestion for what it is worth as a working hypothesis of sufficient reasonableness to draw attention to the condition of these glands in future investigations into a disease which has hitherto eluded elucidation. I have ignored in this paper the other theories which have been advanced to account for it, as they fail to satisfy completely the conditions which Manson has pointed out as indicating a connection between sleeping sickness and the prevalence of Filaria perstans, and my only object is to draw attention to a hypothesis which would be in complete accord with all we know of the disease, if the deep cervical glands were found in all fatal cases to be the seat of inflammatory and obstructive changes caused by the presence, or former presence, of the parent worm. I must leave the suggestion I make in the hands of those who have opportunities, which I do not possess, of investigating this particular point, and only venture to think that if the parent worm, or the results of its presence, are not found in the place indicated, it will be time enough to cast about for some other explanation.

SNAKE-BITE; TREATMENT OF.—Lieutenant C. C. Murison, I.M.S., reports a case of snake-bite (*Echis Carinata* [Fursa]) in a boy, aged 12. About half an hour after the bite the site of the injury—the back of the foot—became painful and swelled up. He was

admitted to hospital, where he stated that the pain in the foot was very bad, and gradually decreased up to the knee, where it was slight. The pain subsequently extended to the right groin, and the superficial and deep reflexes of the right leg were found to be slightly exaggerated. As the patient was getting worse, Lieutenant Murison injected 5 cc. of Calmette's antivenene, the bite being cauterised with silver nitrate, and a 1 in 40 carbolic dressing applied. In fifteen minutes afterwards the pain began to decrease, but the patient being very drowsy the attendants had some difficulty in keeping him awake. In five days from admission the patient was discharged from hospital cured.—Indian Med. Gazette, May, 1902.

YELLOW FEVER AND MOSQUITOES.—In an interesting paper by Edmund Souchon, M.D., in the *Medical Record* of October 25th, 1902, on the subject of "The Eradication of Yellow Fever in Havana," the author gives a list of the epidemics of yellow fever in New Orleans from 1817 to 1899 inclusive—eighty-three years:—

YEAR.	DEATHS.	YEAR.	DEATHS.	YEAR.	DEATES.
1817	809	1845	2	1873	
1818	115	1846	160	1874	11
1819	2,190	1847	2,359	1875	61
	400		808	1876	42
			769	1877	1
1822	239	1850	109	1878	4,046
1823	1	-1851	17	1879	
	108	1852	456	1880	
1825	49	1853	7,970	1881	0
1826	5	1854	2,423	1882	1
1827	109	1855	2,670	1883	4
1828	130	1856	74	1884	1
	215		199	1885	
1830	117	1858	4,855	<b>—</b> 1886	
1831	2	1859	91	1887 1888	
1832		1860	15		
1833	210	1861		1889	
-1834	95	1862	2	1890	
1885	284	1863	2	1891	
	5		6	1892	
1837	442	1865		1893	
1838	17				
1839	452	1867	3,107	1895	
1840	3	_1868	5	1896	
1841	594		3	1897	
1842	211	1870	588	1898	
1843	487	1871	55	1899	23
1844	148	1872	40		

He strenuously opposes Dr. Gorga's contentions that reliance should be placed on the destruction of the mosquitoes, which would practically mean the abolition of quarantine. Though the author has a thorough belief in the transmission of yellow fever by mosquitoes, as demonstrated by the memorable labours of Dr. Walter Reed, his co-workers and followers, he believes, from practical facts before him, that there is some other means of transmission.

Dr. Souchon concludes his article: "Until these facts are satisfactorily explained and demonstrated to us, we, of the Louisiana State Board of Health, the guardians of the health of the city of New Orleans, the State of Louisiana and of the whole Mississippi Valley, cannot think of altering the present maritime

quarantine regulations."

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THE

# Journal of Tropical Medicine

NOVEMBER 15, 1902.

## RESEARCH LABORATORIES IN KHARTOUM.

THE announcement that research laboratories are to be founded at Gordon's Memorial College, Khartoum, is an important step in the progress of the civilisation of the Soudan. The chemical and bacteriological laboratories about to be opened there are the gift of Henry S. Wellcome, Esq., of the well-known firm of Messrs. Burroughs Wellcome and Co., of London. The environment of Khartoum is an unknown factor so far as disease is concerned, and important results are likely to reward the munificent founder of the Institution.

Standing as it does as a watch tower between Central Africa and the Nile Valley, Khartoum will become in the near future, a political and economic factor of far-reaching consequence; and the influence of Gordon's Memorial College, inasmuch as it promises to be a centre of scientific education and research, will add immensely to the prestige of this singularly situated city.

The Colonial and Foreign Offices, under their present directorates, have come to grasp the importance of the health of the people, both native and foreign, as an economic factor in the development of every tropical and sub-tropical country; and the soundness of this doctrine is already bearing fruit in many of our colonies and protectorates.

We are specially interested at the present moment in the advance and spread of several ailments, and in none more so than in that of sleeping sickness. We have from time to time drawn attention to the fact that this disease has crossed the high plateau between the valley and the Congo and the upper reaches of the Nile, and seems to be devastating countries in which, until the last few months, the disease had been unknown. Should the spread continue, the inhabitants of the Nile Valley and all between Uganda and the coast are threatened with this deadly scourge, and it is of the utmost consequence that a watch should be kept upon its For this reason alone we welcome advance. the establishment of scientific laboratories in the Eastern Soudan; and this is but one example, of many that might be adduced, to prove the vital necessity of the application of modern research laboratories as guardians of the public health in outlying regions of civilisation.

We hope a brilliant future awaits this recently established seat of science, and when we consider the obscurity that prevails concerning the Dark Continent, be it of its peoples, its agriculture, or its diseases, we are sure that the hope we entertain, that the obscurity will speedily be dispelled, is well founded. It is gratifying to know that so able a Director has been chosen to superintend the research laboratories. Dr. Andrew Balfour is so well known as a reliable and careful investigator, that the work is sure to be well done; and as the material at his command is illimitable, we are certain to have additions to our scientific knowledge of lasting benefit and importance. The natives of the Soudan owe a lasting debt of gratitude to Mr. Wellcome for his public-spirited and philanthropic gift; and all students of tropical medicine are indebted to him for the opportunity given them of elucidating many of the pathological problems which, owing to imperfect means of obtaining information, are still unsolved.

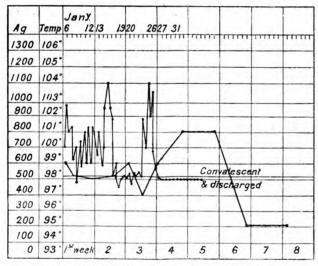
# British Medical Association.

#### MEDITERRANEAN FEVER.

By Staff-Surgeon P. W. Bassett-Smith, R.N. Lecturer on Tropical Diseases, Haslar.

THE AGGLUTINATING PROPERTIES IN THE BLOOD IN CASES OF MEDITERRANEAN FEVER, WITH SPECIAL REGARD TO PROGNOSIS, AND REMARKS ON OTHER BLOOD CHANGES AND REACTIONS DURING THE COURSE OF THE DISEASE.

While in charge of wards for the treatment of tropical diseases at the Royal Naval Hospital, Haslar, the number of cases admitted suffering from Mediterranean fever during the past two years and a half has been considerable (196). This disease, which causes such a drain on the naval forces, particularly on the Mediterranean station, has from its importance demanded particular attention. The cases received are mostly in the persons of officers and men who have been under treatment for a more or less prolonged



No. 1. Group 1, short duration, high agglutinins.

period on that station, and having been invalided home arrive either fairly convalescent, or to run through a series of relapses often very acute, which may end in complete recovery, or produce such a permanent cachexia and loss of strength that it necessitates their being invalided out of the service.

The number of cases which have been available for systematic observation has therefore been abundant, and they have been utilised to furnish the observa-

tions which are here recorded. It was in 1887 that Bruce isolated and definitely ascertained that the specific cause of the disease was due to the presence of a minute micrococcus abundantly present in the spleen both in the living and dead. Since that time his observations have been repeatedly confirmed. In 1901 I obtained a pure culture of the organism from the spleen removed three hours after death of a fatal case which occurred here, and from which and other strains the agglutination reactions have been made Bruce at Malta, Wright and Semple at Netley, found that the organism injected into monkeys produced a fever like that of the human subject, and from them again isolated the same organism. Unfortunately the specific action of the micrococcus melitensis has been too frequently demonstrated by inoculation, accidental and otherwise, in laboratory work, the following cases being recorded :-

1897A.E.W	·	Netley	 Purposeful inoculation	Incubation	 15	day
1897S.	• •	,,	Accidental	.,	 15	,,
1899Corp.	S	,,,	,,	 ,,		-
1900B. S.		Haslar		 ,,	. 6	day
1900S.		Netley	 ,,	,,,	. 5	,,

The agglutination of the micrococcus when brought in contact with dilutions of blood of patients suffering from Mediterranean fever was early established, and became an efficient method for diagnosing this at times most irregular disease, and years of experience at Malta, Netley and Haslar have proved its value, and, as in typhoid, serum diagnosis is now regularly carried out, the agglutinating properties are even more marked than in the latter disease, commencing earlier (five days Surgeon S.) and lasting long (one and a half years, B. S.), and acting in higher dilutions of serum, the clumping being more compact, and as seen macroscopically, more definite.

In September, 1899, C. Birt and G. Lamb made a number of observations showing the relative agglutinating powers of the serum during the course of the disease in 15 cases.<sup>1</sup>

In repeating like experiments I wished to see whether their results would be confirmed.

The technique employed consisted in using an emulsion made from a five-day-old agar culture of the micrococcus in saline solution; this was drawn up into sterile pipettes and killed by heating for a period of fifteen minutes at 65° C., the same series of pipettes being utilised throughout in the cases. The blood was centrifugalised and the serum generally employed a few hours after it was obtained; the dilutions were made with a measuring pipette as recommended by Wright, an equal part of diluted serum (20 c.cm.) and emulsion being always used, so that the number of organisms present in each sedimentation tube was approximately the same in each instance; these were left at room temperature for twenty-four hours and the results then recorded, the dilutions ranging from 1 in 20 to 1 in 2,000.

Examinations to show the relative amount of agglutinins present have been made in 56 cases, excluding those in which two only were recorded; these were made weekly, a series from the ward being taken together, and the whole technique regularly performed

by myself. From some of these, charts showing the fever curve and agglutination curve have been drawn up and reduced by photography, so as to bring the long periods covered within reasonable limits.

Few cases were received early enough to ascertain the reactions during the first weeks of the fever, and there was no fatal case in the series; in the only case where the examinations were made at the commencement a reaction as high as 1 in 600 was present on the fifth day. From a careful study of the clinical characters of the cases and the agglutination curves, we find:—

(1) That in cases of short duration and moderate severity the agglutinins are generally sustained high, 400 and upwards, falling when normal health is established, as Mr. S., R.N., No. 1.

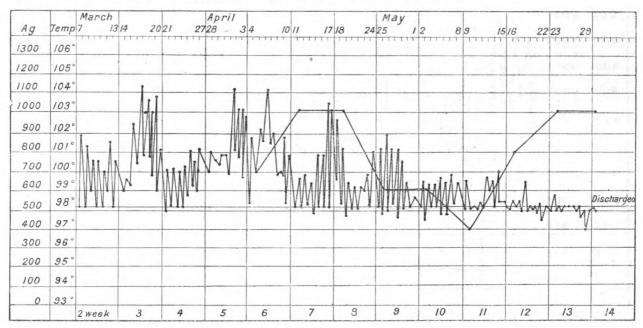
(2) Cases with acute clinical symptoms having at

first high agglutinins more or less regularly sustained, but generally falling as the fever passes off and debility becomes marked, to rise again in convalescence, as Mr. D., R.N., No. 2; G., No. 3.

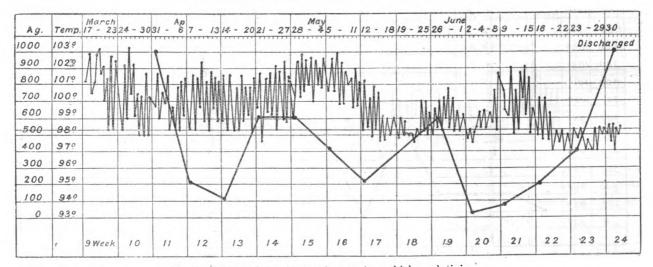
(3) Cases with acute symptoms, in which the agglutinins are from the first very low, rising more or less regularly as convalescence progresses; these cases are severe throughout. As R.W., No. 4, No. 5, No 6.

(4) Cases with acute relapses where the agglutinins remain permanently low, and in which debility and anæmia are very great, many of these having to be finally invalided, as No. 7, No. 8, No. 9.

(5) Very chronic cases, with protracted slight relapses or continued fever of a mild hectic type, where from low agglutinins there is later a considerable increase, the patients ultimately making a good recovery, as No. 10, No. 11.



No. 2 .-- Group 2, longer case, acute symptoms, high agglutinins.



No. 3.—Group 2, long case, acute symptoms, high agglutinins.

(6) Very chronic cases, with prolonged irregular fever, great anæmia and debility, where the agglutinins remain constantly low and improvement is slight, most of these being invalided out of the service, as C., No. 12.

It is seen that the high agglutinating power of healthy convalescents slowly falls again, but reacting to 1 in 100 or less for months in debilitated convalescents: as seen above, there is no rise.

From the above, we may gather for prognosis that:-

(1) High sustained agglutinins in the early stages of the fever are favourable.

(2) A continuation of low agglutinins during the whole course of the fever and following cachexia is

bad, the cases dragging on for years with recurrent attacks of slight fever, and the neuroses so difficult to cure.

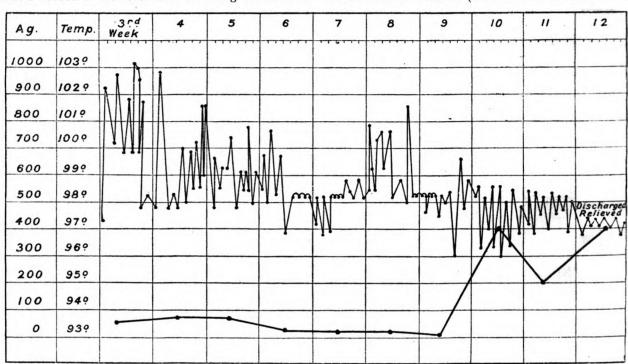
(3) A continuous rise, with improving clinical symptoms, indicates approaching convalescence.

(4) That as a rule there is no relation of the agglutination curve with that of the fever.

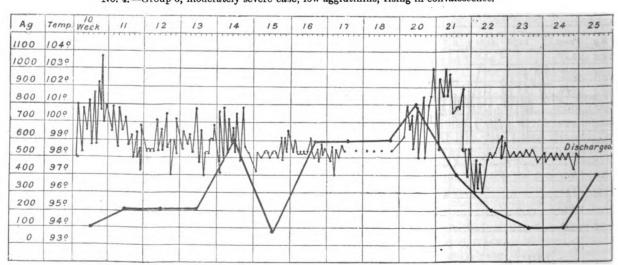
These observations are in harmony with those of Birt and Lamb.

#### Bactericidal Observations.

During this period, while investigating the characters of this disease in the cases invalided from the Mediterranean and elsewhere (for it is not restricted to the

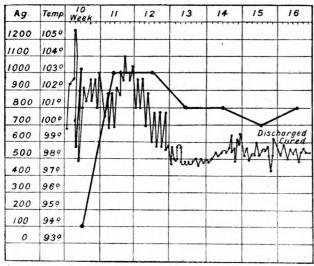


No. 4. —Group 3, moderately severe case, low agglutinins, rising in convalescence.



No. 5.- Group 3, severe case, low agglutinins, rising in convalescence.

former area, as has long been believed: quite lately I have examined blood from two men invalided from China who suffered from what clinically appeared to be this disease, or a fever closely allied, in which the serum gave strong agglutination reaction in dilutions 1-40, 60, 80, 100, and 200, but not above), the question of the presence of immune body in the blood becomes one of great importance; I have therefore carried out a series of observations to test the bacteri-



No. 6.—Group 3, severe case, low agglutinins, rising in convalescence.

cidal properties of fresh serum, which may be divided under the following headings:—

- (1) Those suffering from the fever at the time.
- (2) Those convalescent from an attack.
- (3) Those in health never having had an attack.
- (4) To see if there was any relationship between the bactericidal power and the agglutinating properties of the serum.

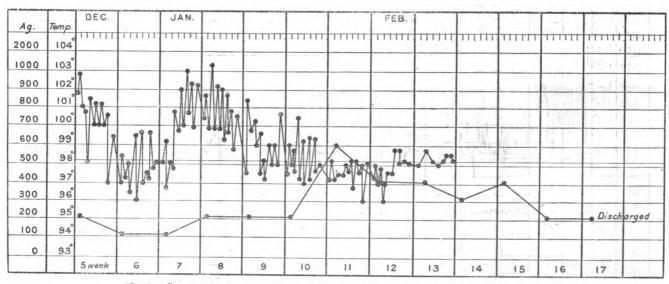
Technique employed: The finger having been well sterilised, a considerable quantity of blood is drawn

into sterile pipettes, and placed in the incubator at  $37^{\circ}$  C. for one to two hours, then centrifugalised. A broth culture of micrococcus melitensis of generally one week's growth is taken and dilutions made (1) 10 c.mm. are added to 10 c.cm. of broth and well mixed, and from this 10 c.mm. again to 10 c.cm. of broth, giving a dilution of 1 in 1,000,000 = A, and from this in carefully sterilised watch glasses dilutions of 1 in 10,000,000 = B, and 1 in 100,000,000 = C, are easily made; from these high dilutions sloped agar tubes are inoculated with 5 and 10 c.mm. and in four or five days the colonies counted, when the relative number of organisms in each dilution can be estimated.

Equal parts of clear blood serum and A, B, and C are drawn up in tubes with spiral twist as recommended by Wright,<sup>2</sup> incubated at 37° C. for twenty-four hours, and then blown out on thick agar plates, which are incubated for three to seven days, when the presence or absence of growth of micrococcus melitensis can be observed; if there is no growth one infers that the serum has been able to kill off the organisms present in that dilution, and so estimate the bactericidal power, which is in all cases very considerably less than that found against the typhoid organism.

The following is a tabulated result of 15 cases so treated:—

From the above one would gather that in acute, chronic, and convalescent cases, the bactericidal power of the serum against the specific organism of Mediterranean fever is very slight, very much less than that usually of healthy individuals who have never suffered from the disease, and that if this procedure gives any adequate estimation of the immunity of the subject, then those who have lately recovered from the disease are less able to resist the invasion of the organism if introduced, and therefore more prone for a period to reinfection, and that if this is so, men who have lately recovered from an attack should not return to the endemic area for some time, and also the necessity for early invaliding becomes more apparent.



No. 7.—Group 4, severe case, great anæmia, incomplete recovery, low agglutinins throughout.

RESULT OF BACTERICIDAL OBSERVATIONS.

Case	Name	Cha	racter	Da	te			. of nisms	Result	Con	trol	Result
1	D.		attack	April				c.mm.	Not Killed	Hea labo	urer	Killed.
		Conva	lescent	May	28	Ι ,,	5	,,	,,	Hea		Not killed.
2	T.	Acute	attack	,,,	18	8 ,,		,,	,,	,,	(2)	Killed.
	H.	,,	,,	June		1 ,,		,,	,,	,,	(3)	,,
3	11.	,,	,,	May	18	8 ,,	5	,,	"	,,	(1)	Not killed.
		,,	"	,,	25	I ,,	5	"	,,	,,	(1)	)) ))
			lescent	June		Ι,,	5	,,	,,	,,	(5)	Killed.
4	S.	Acute	attack	May		Ι,,	5	,,	,,	,,	(4)	Not killed.
		,,	,,	June	8		10	,,	,,	,,	(3)	Killed.
5	O. W.	,,	,,	May		Ι,,	5	"	,,	,,	(1)	Not killed.
7	F.	Chroni	,,	June	8	Ι,,	5	,,	"	,,	(3)	Killed.
'	•		chexia	,,	0	Ι,,	5	"	,,	"	(3)	,,
8	Q.	,,	,,		22	Ι,,	5	,,	,,	,,	(5)	,,
9	M.	,,	,,	May		Ι,,	5	,,	,,	,,,	(1)	Not killed.
		,,	,,		25	Ι,,	5	,,	,,	,,,	(4)	Killed."
10	s:	,,	,,	June	6	Ι,,	5	,,	"	"	(5)	Killed.
.0	5.	"	"	may	18	I ,,	5	,,	,,	,,;	(3)	Not killed.
11	C.	,,	,,	April		3 ,,	5	"	"	,,	(5)	)) ))
12	B.	Conval		May	6	1 ,,	5	,,	,, .	,,	(3)	Killed.
13	В.	,,	,,	,,	6	Ι,,	5	,,	,,	,,	(3)	
14	S.	,,	,,	,,	6	Ι,,	5	,,	Killed	,,	(3)	
15	T.	,,	,,	,,	6	Ι ,,	5	,,	Not killed	,,	(3)	

#### Phagocytic Power of Leucocytes.

Besides, however, the protective influence of the immunising bodies in the blood serum, we have also the active phagocytic powers of the leucocytes themselves in carrying out the warfare against these minute organisms, a principle brought forward strongly by Metchnikoff to explain the facts of natural and acquired immunity.

The technique for demonstrating this has been lately described by Major Leishman,<sup>3</sup> it was interesting and important to see whether in this disease there was

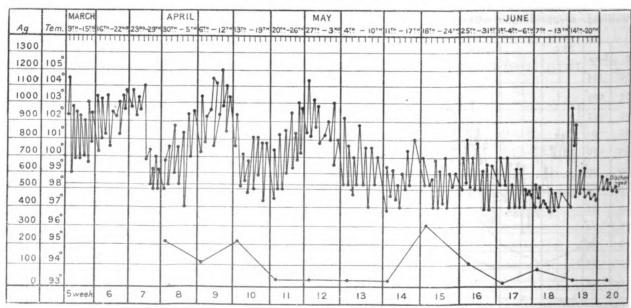
any marked increase or diminution in activity of the leucocytes. The method of Leishman was followed strictly, but the difficulties of enumeration are considerable, owing to the minute size of the micrococcus, his modified Romanowski's stain giving the best results, though for ordinary blood work I prefer that of Louis Jenner, being more rapid, cleaner, and less trouble if the slides are placed upright in a jar of the stain.

In thirteen cases examined the average organisms found inside the polymorphonuclear leucocytes were few in cases of Mediterranean fever, whereas in the controls of normal blood they were always higher; it would therefore seem that not only is the bactericidal power of the blood low, but that also the phagocytic properties of the leucocytes is diminished.

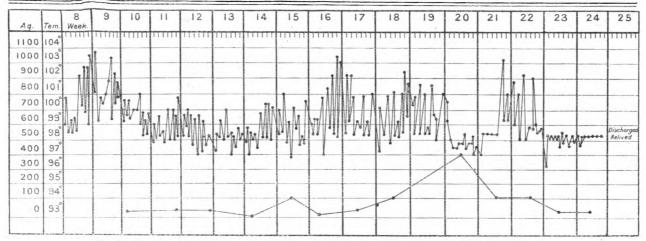
#### General Blood Changes.

In the weekly examinations of the blood the hydræmic condition of the fluid is very apparent to every one. The red cells often falling to a very low figure, in one counted as little as 2,800,000 frequently between 3,000,000 and 4,000,000, the cells themselves being deficient in hæmoglobin, very irregular in size and shape, microcytes being particularly abundant, but I have never found any nucleated red forms in the routine examination of the blood films, though blood plates in the more advanced cachectic cases are certainly increased, staining readily with Louis Jenner's method. The white cells are often relatively increased, but never, I believe, absolutely, the highest count being 6,600, but there is undoubtedly in most instances a great relative preponderance of the mononuclear basophilic cells, sometimes exceeding in number the neutrophiles or polymorphonuclear leucocytes, the proportion of the former ranging from 35 to 76 per cent., while that of normal blood is 25 to 35 per cent., and in leucocytosis from pus or acute pneumonia it is 11 to 14 per cent.

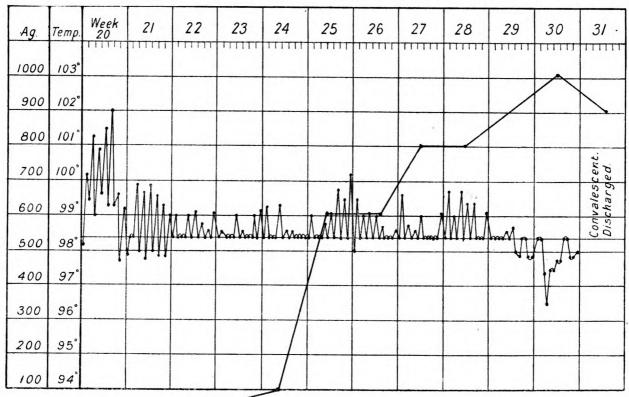
This great diminution in the number of red cells



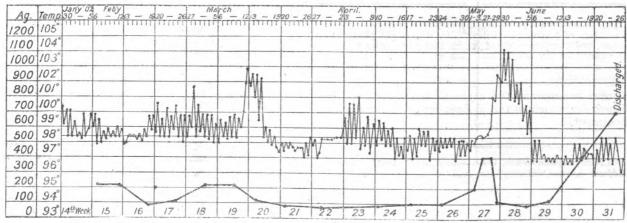
No. 8.—Group 4, severe case, great anemia, incomplete recovery, low agglutinins throughout.



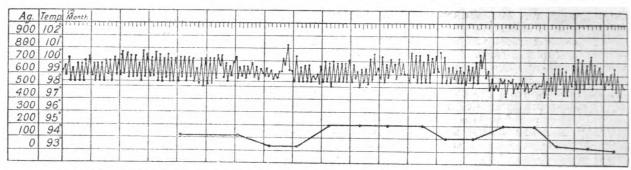
No. 9.—Group 4, severe case, great anæmia, incomplete recovery, low agglutinins throughout.



No. 10.-Group 5, chronic case, good recovery, agglutinins rising, high in convalesence.



No. 11.—Group 5, chronic case, fair recovery, persistently low agglutinins, rising before discharge.



No. 12.—Group 6, very chronic case, hectic fever (two years), invalided, persistently low agglutinins.

and low hæmoglobin value with the abnormal condition of the white cells undoubtedly accounts for the intense cachexia, slow, and so often incomplete, recovery of unfortunately such numbers of men who have returned to England suffering from Mediterranean fever; and I believe strongly that all cases should be removed from the endemic area as soon as possible, for if the disease is protracted for a period

TABLE GIVING THE RELATION OF THE BACTERICIDAL, PHAGOCYTIC, AND AGGLUTINATIVE POWERS, WITH PERCENTAGE OF MONONUCLEAR CELLS TO TOTAL WHITE CELLS.

No.	. Character of Case		Bac cid Pov		Phago- cytic Power	nu	hest I tion w omple tutina	ith te	Relative Pe age of Mono Cells to Leucocy	nuclear Total
1	Acute attack		Nil		_	I in	40		75	
	,, ,,		,,		Fair	I ,,	400		65	
	Convalescent		Goo	d	Slight	1 ,,	40		53	
2	Acute attack		Nil		_	I	100		59	
	,, ,,		,,		Fair		400		64	
3	,, ,,		,,		,,	I				
4	" "		,,		Slight	Ι ,,	800	•••	46, short	dura-
5	Chronic cachexia		,,		,,	Ι,,	40	,	46	
6	,, ,,		,,		,,		100		4.	
	Convalescent		,,		,,		800		57	
78	Chronic cachexia		,,		,,		400		69	
100	,, ,,		,,		Nil		100		-	
9	Convalescent		,,		Slight		100		26, slight mia.	anæ•
10	,,		,,		,,	I	100		59	-
H	,,		,,		,,		400		41	
12	,,		,,		Nil	Ι,,			44	
13	", $1\frac{1}{2}$ "	yr.	Fair		Good	I .,	40		40	
14	Healthy control,	I	Good	d	-	Nil			33	
15	,, ,,	2	,,		Slight	,,			31	
16	,, ,,	3	Nil		Fair	,,				
17	,,, ,,	4	Good	d	,,	,,			35	

This table shows negative bactericidal power, great reduction in percentage of polymorphonuclear cells, with slight phagocytic action, and no relationship of bactericidal power with amount of agglutinins present in the cases of Mediterranean fever, with good bactericidal and fair phagocytic power in the healthy controls.

of over two months this cachectic condition is established, for which at the present we have no reliable treatment.

#### REFERENCES.

## Beprints.

# WHAT IS THE NATURE OF THE PORTO RICAN "ANÆMIA"?

By HERBERT M. McConathy, M.D.

During the years of 1899 and 1900 the attention of the U.S. Army surgeons who were then serving in Porto Rico was called to a disease which is common among the inhabitants of that island, and which is known there simply as "anæmia." This disease is interesting first, on account of its high mortality—there are practically no recoveries; and secondly, on account of its prevalence. I asked several resident Spanish physicians for an estimate as to its prevalence, and was astonished to find that at least 50 per cent. of the total number of deaths are attributed to this disease alone.

Opinions as to the cause of this trouble are various. Insufficient nourishment is, naturally, the usual reason assigned, because the poorer people live almost exclusively on plantains. There are some who think rheumatism an important factor on account of the pains in the limbs during the earlier stages and the frequent involvement of the heart which follows. The only real study of the disease of which I have heard was that made by Lieut. Bailey K. Ashford, Assistant Surgeon, U.S. Army, who was at that time in charge of the hospital at Ponce. Dr. Ashford pronounced the disease ankylostomiasis.

From about September 1st, 1899, to about August 1st, 1900, I was stationed in Adjuntas, a small town in the interior where this disease is especially common, and during these eleven months I saw hundreds of cases. As my post was small I could not secure a microscope, but I made many autopsies.

During the first stages most patients complained of pains in the limbs, sometimes quite severe, but hard to locate definitely. Tenderness on deep pressure of the limbs was generally elicited during the examination although partial anæsthesia of the skin was frequently noted. In many cases the gait appeared more or less ataxic. Dilatation of the heart was always found, and during the later stages this was usually accompanied by a general anasarca; a swelling of the feet being one of the earliest symptoms. This dilatation of the heart is not, as a rule, accompanied by any valvular disease or other signs of endocarditis, though a relative valvular insufficiency, owing to the

<sup>&</sup>lt;sup>1</sup> Lancet, September 9th, 1899. <sup>2</sup> 1bid., June, 1901. <sup>3</sup> British Medical Journal, January 11th, 1902.

dilated rings, is very early and constantly noted, and

gives, of course, a strong systolic murmur.

Insufficient and improper food is, without doubt, the main predisposing cause of the disease, in fact it is hard to understand how a human being can sustain life on the diet on which a majority of the Porto Ricans subsist, especially those who live in the mountain. But starvation cannot be the only cause of this so-called "anæmia," for cases are occasionally met with in persons who are well fed. The rheumatism theory can be dropped on account of the absence of definite joint symptoms and of endo- or pericarditis. As to ankylostomiasis, I can readily credit the statement that it is wide-spread in Porto Rico and productive of much harm, but this diagnosis will not account for the partial anæsthesia, the rheumatic pains, and the tenderness of the muscles on deep pressure. The dilatation of the heart I found to be such an early and constant symptom that it is hard for me to believe it merely a result of the anæmia.

Since coming to the Philippines I have seen a disease which reminds me very forcibly of the Porto Rican one; it is beri-beri. The more I see of beriberi the more striking the resemblance seems. I regret that I did not test the knee-jerk in the Porto Rican "anæmia," for the absence of this reflex is an important point in the diagnosis of beri-beri, and this is the only thing lacking to establish, in my opinion, the identity of the two diseases. It would not surprise me if it were found upon investigation that beri-beri and ankylostomiasis were combined in many of these

cases of Porto Rican "anæmia."

This disease is generally chronic in its course, and its victims exist in a state of invalidism or semi-invalidism for months before they finally succumb. This fact, combined with the exceeding prevalence of the malady, greatly impairs the working power of the population and interferes most seriously with the progress of the island.—Reprinted from the "Journal of the Association of Military Surgeons of the U.S.," May, 1902.

We note with satisfaction the following honours recently conferred by the King:—

Order of the Bath.

Brigade Surgeon-Lieutenant-Colonel A. Crombie, M.D., retired, late Indian Medical Service, to be Companion of the Order of the Bath, Civil Division.

Order of St. Michael and St. George.

William H. W. Strachan, Chief Medical Officer of the Colony of Lagos, to be Companion of the Order of St. Michael and St. George.

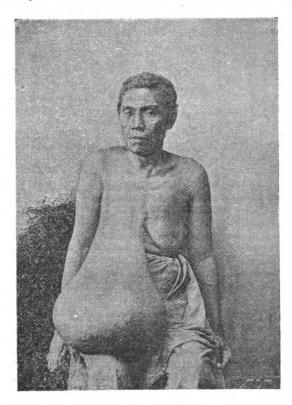
# Obituary.

It is with much regret that we have to record the death of Stanford Harris, M.D.Durh., M.R.C.S.Eng., L.S.A., which took place recently in Southampton. Dr. Harris was the Medical Superintendent of the Guimar Hospital for tuberculosis, at Teneriffe, and one of the pioneers of the open-air and climatic treatment of consumption.

## Rebiews.

THE DISEASES OF THE SAMOAN ISLANDS.

Dr. Augustin Krümer, of the German Navy, in an addendum to the second volume of reports published in Stuttgart by E. Nägele, describes the most important skin diseases met with on the South Sea Islands. Amongst these he refers to tinea circinata and im-



bricata, verruga and frambœsia, elephantiasis and leprosy. The descriptions are good, and Dr. Krümer's long experience in Samoa renders the statements authentic. The book is illustrated by photographs taken by himself, one of which—elephantiasis of the mamma—we reproduce by the permission of the publisher.

TROPICAL HYGIENE (Tropen Hygiene). By Professor Dr. F. Plehn. With 5 plates and 5 illustrations in the text. 1902: Gustav Fischer, Jena. Pp. 282.

Dr. F. Plehn systematically divides his book into twenty lectures, comprising:—(1) Tropical climate in general. (2) The climate in the tropical colonies of Germany. (3) The influence of the tropical climate on the human organism, and acclimatisation. (4) Tropical malaria. (5) The exciters of malaria and manner of transmission. (6) The prevention of malaria. (7) Course and treatment of tropical malaria. (8) Blackwater fever. (9) Small-pox and plague in regard to the German Colonies. (10) Tropical skin diseases. (11) Gástric and intestinal diseases in the Tropics. (12) Animal parasites of man in the Tropics. (13) Snake venom and arrow poison in the

Tropics. (14) Diseases of eyes and ears; injuries. (15) Preparation for Colonial service and voyage out. (16) Tropical houses. (17) Position of stations in the Tropics. (18) Tropical life on the station. (19) Hygiene of expeditions. (20) Drugs for the Tropics.

The book is convenient in size, clear in style, and should prove of the greatest service to laymen as well as medical men proceeding from German-speaking

countries to warm countries.

All Dr. F. Plehn's work is so thorough and reliable that implicit confidence may be placed on his statements and his recommendations.

# Hews and Motes.

Brandy from the Grape.—For medicinal purposes we would welcome a pure brandy. There is but one form of brandy which can be so regarded, and it remains in our pharmacopæia as Spiritus Vini Gallici, B.P., and is defined as "a coloured and flavoured variety of alcohol distilled from French wine." How much of the brandy on the market, even when stated to be specially prepared for invalids, has any grape product in its composition, it is difficult to ascertain. In North Germany, Holland, and this country, brandy is produced from raw grain or potatoes, consisting of spirit and flavourings wholly independent of the grape. That such compounds should masquerade as brandy according to the definition of the Pharmacopæia is, to say the least of it, unfortunate. It would appear that it does not pay to produce brandy from the grape in Europe. Why this is so it is difficult to ascertain, for grapes and to spare seem plentiful enough. We must look beyond Europe, evidently, if we are to obtain a brandy made from this grape juice; to a country where the grape is not wholly used for the produc-tion of still or sparkling wines, but where there is a surplus from which brandy may be distilled. The Australians are making an effort to once more place brandy made from the grape on the market in Britain, and we have been favoured with samples of the "Orion" brandy professing to be made from the grape. The aroma of this brandy leaves no doubt that the producers' statement is correct, and could they assure the medical profession that all their brandies are made from the grape they would command an extensive sale.

THE LADY CURZON'S HOSPITAL AT SECUNDERABAD.—
The new Maternity ward which has been built and presented by Sett Ram Gopal, as an addition to the Civil Hospital, was opened on September 5th, 1902. The new Maternity ward provides accommodation for 14 beds—6 for Europeans and 8 for natives. The total number of females admitted for confinement in the other wards last year was 100.

RESEARCH LABORATORIES AT KHARTOUM—PRESENTATION BY MR. HENRY S. WELLCOME.—The Gordon Memorial College at Khartoum which Lord Kitchener opened on Saturday last, is now ready for the chemical and bacteriological research laboratories

presented by Mr. Henry S. Wellcome during his recent visit to the Soudan. The fixtures and appliances made in England have already been shipped. The equipment for scientific work is most complete in every detail, and will be equal to any similar laboratories in Europe. The Sirdar has appointed as Director of these research laboratories, Andrew Balfour, M.D., B.Sc., D.P.H., of Edinburgh, whose work in bacteriology is well known in professional circles. The Soudan presents exceptional opportunities for the study of tropical diseases. especially malaria, typhoid and dysentery, and it is anticipated that the results of the investigations of Dr. Balfour and his staff will be of the greatest importance. Dr. Balfour will also assist the authorities in the investigation of the criminal poisoning cases, which are very frequent in the Soudan. The character of the poisons used by the natives is at present often obscure, and it is possible that the work in these laboratories may considerably increase our knowledge of toxic agents. Apart from the original researches and general sanitary work, Dr. Balfour and his staff will devote their attention to the study of the cereals, textile fibres, and various matters affecting the development of the agricultural and mineral resources of the country.

# Current Viterature.

SUMMER DIARRHEA IN CHILDREN-TREATMENT.

(1) W. L. Harris concludes that summer diarrhea is to a great extent a preventable disease, and it is our duty to do all we can to instruct the mother and nurse in the care and feeding of children. In our treatment of this disease we should always stop the milk, give a purge, and then carefully regulate the diet for a few days, even in the simplest and mildest cases, and in this way prevent many a case of the more serious forms of diarrhea. The treatment of the first few days is the most important in all cases, and even the simplest cases should never be neglected under the delusion that it is natural for a teething child to have diarrhea.

(2) Maurice Ostheimer, after considering the prophylaxis of the disease, states that the most important treatment is absolute withdrawal of food, no matter what the infant is taking. The child should be kept in its carriage out of doors, or if this is not possible, in the largest room in the house with the windows open. Few drugs are necessary. In case of vomiting, calomel is given. When there is no vomiting, castor oil is indicated. If frequent bowel movements persist, bismuth subnitrate with a little salol is given. During convalescence, a few drops of tincture of nux vomica will often be of service. As the Health Boards of the large cities continue to distribute hygienic regulations for the care of babies, the poor are gradually learning how to care for their children.

(3) James H. McKee offers the following classification of these diarrheas:—(i.) Dyspeptic; due chiefly to improper or to imperfectly-digested food. Bacteria

may or may not play a part; acute intestinal indigestion; dyspeptic diarrhœa. (ii.) Infectious; in which bacteria of different kinds play the important rôle. Such organisms are almost invariably introduced in food, and nearly always in cow's milk. (a) Fermentative diarrhea; mild gastro-enteric infection. (b) Ileocolitis, enterocolitis, acute or chronic. (c) Cholera
infantum. The first consideration in any form of
diarrhea is the diet. In the case of a bottle-fed baby, unless the trouble is mild dyspeptic diarrhœa, it is safer to withdraw milk. In dyspeptic diarrhea of mild grade, the weaker milk formula or peptonised milk is advisable. In case of a milk infection, milk is withdrawn. Boiled water should be given frequently for the first twenty-four hours, but no nourishment. Barley water may then be given. If the baby will not take it a few drops of aromatic spirits of ammonia will often make it acceptable. When the diarrhoa has been caused by an excess of carbohydrates, barley water is contraindicated. Beef juice is usually wel borne. Animal broths may be given on the third day. Milk feeding should always be gradually resumed. A purge should always be given as a preliminary. Castor oil and calomel are the best. In some cases an astringent, such as the salts of bismuth, or silver nitrate, is indicated. The writer has had good results from salol as an intestinal antiseptic. Some form of opium is indicated in certain cases. Enteroclysis and hypodermoclysis are indicated in some cases. As stimulants, when necessary, brandy, old whiskey, atropine and strychnine are valuable. The cold pack is valuable in the treatment of fever. The most frequent complication is catarrhal pneumonia, which is to be treated as it is when occurring under ordinary conditions .- Philadelphia Med. Journ., July 26th, 1902.

(4) Dr. Loms Fischer points out that in the presence of fever, gastro-enteric disorders, summer diarrhœa, &c., in children, it is often requisite to stop milk feeding. Under such circumstances the following substitutes have been of special value in Dr. Fischer's hands, and are offered for temporary use in gastric and intestinal derangements.

Formulæ for weak infants in substitute feeding:

When vomiting and diarrhœa persist give either

Barley water ... ... 4 ounces

Or, Oatmeal water Oatmeal water ... ... ... 4 ounces
Feed the child with this amount every two or three hours.
Sweeten with granulated sugar, half a teaspoonful to each
bottle; or, if fermentation exists, as shown by colic, greenish stools, and eructations, with half a grain of saccharine in place of the sugar.

The following are Dr. Fischer's methods of prepar-

ing barley water and oatmeal water :-

Barley water can best be made by taking one heaping tablespoonful of ground barley flour and adding the same to one pint of water. Boil this thoroughly for half an hour, then strain through cheese-cloth and add enough water to make one pint of barley water. When barley water is given for any length of time, and constipation results therefrom, then glycerine should be added. One teaspoonful of glycerine to each teacupful of barley water will make the same quite palatable, and will offset the constipating tendency.

Oatmeal water can be made by adding one tablespoonful of oatmeal flour to a pint of water, boiling the same in the same manner above described for the preparation of barley water.

If the child is underfed, then frequently the addition of the white of a raw egg, well beaten, with either the barley water or oatmeal water, will be found

advantageous.

Dr. Fischer has also frequently added the yolk of an egg, well beaten, with barley water or oatmeal water properly sweetened, as a temporary substitute.

Dr. Fischer's formula for almond milk food is:-... ... ... 4 ounces gar... ... 1 teaspoonful Almond milk Granulated sugar... M. Give the foregoing quantity every three hours.

Formulæ for whey feeding :--

To make whey, take half a pint of fresh milk, heated lukewarm, not warmer than can be agreeably borne by the mouth (about 115° F.); add one teaspoonful of essence of pepsine, and stir just enough to mix. Pour into custard cups; let it stand until firmly curdled; then beat up with a fork until the curd is finely divided; now strain and the whey is ready for use.

The whey may be administered as follows:-

For an infant under six months:-

Whey ... ... ... 2 ounces Milk ... 1 ounce
Warm to blood temperature (about 100° F.) for three minutes, then feed. The above quantity can be given every two hours or two hours and a half.

When feeding a child from two to four months old :-

... ... ... ... 2 ounces Milk ... To be given every three hours.

If the above is well borne, we must gradually increase by adding an ounce of food; the formula will then be:—

Whey

The general condition of the infant-its sleep, its stool, and its body weight-is the important factor to determine an increase in the quantity of food.

If the child cries very much after feeding and appears hungry, then we may give: -

Whey ... ... ... ... 3 ounces ... ... ... ... 3 ounces Milk ... Every three hours.

Some children at three months will take very readily six ounces of food. If the appetite warrants it, and the stool is homogeneous and well digested, then we need not hesitate to give the following:-

... 3 ounces ... ... ... ... ... ... Milk ... ... 4 ounces Every three hours.

The weight is the determining factor. If the child does not thrive, increase the quantity of milk and decrease the whey.

In the case of feeble and debilitated children, Dr. Fischer frequently orders sweetened whey instead of water for quenching thirst. This is especially valuable in summer.—Med. Record, August 2nd,

TREATMENT OF DYSENTERY.—J. B. Brandon, M.D., of Dudley, Mo. (Medical Brief, October, 1902), recommends the following mixture, to be used when the bowels move very frequently, when there is much pain, when the evacuations consist only of blood and mucus, and the tongue is of a scarlet colour.

> Sulph. Acid. Arom. or Dil. Tinct. Opil . . . . . . . . . . Sat. Sol. Magnesia Sulph. q. s. ad Ziii.

Of this mixture a teaspoonful is to be given every two or three hours in water, until the blood and mucus has disappeared from the stool, which generally occurs in between twelve to forty-eight hours, according to the severity of the attack.

Dr. Brandon, in addition, advises the local application of turpentine to the abdomen. The diet must be light, consisting by preference of rice, soup, and chicken broth, given in small quantities at frequent intervals. When the blood has disappeared from the stools, the usual lactopeptin, pepsin and bismuth are given in doses.

In cases with symptoms as follows: Bowels moving freely, tenderness in the bowels, slight rise of temperature—101°—102.5° F., with the tongue heavily coated, and edges of tongue strawberry colour, the following mixture should be given at once:-

R	Hyd. Subchlor.	 	 	2 grs.
	Sodii Bicarb.	 	 	2 ,,
	Salol	 • 00	 	24 ,,
	Bismuth Subnit.	 	 	32 ,,

M. et ft. Sig.: One powder every three hours until the tongue cleans.

(Alternate this with) :-

	B Bismuth					3ii.
M	Elix. lactopeptin		• •	q. 8	ad.	Зіі.
M.	Sig. : Every three hor	urs.	-			

#### PLAGUE.

India.—During the two weeks ending October 11th and 18th, the deaths from plague in India numbered 10,108 and 10,750 respectively; of these totals, 7,057 and 7,351 respectively occurred in the Bombay districts.

EGYPT.—No fresh cases of plague occurred in Egypt during the week ending October 19th.

South Africa.—During the week ending October 4th, no cases of plague were reported in human beings from any part of Cape Colony, but at Port Elizabeth plague-infected rats were found.

MAURITIUS.—During the week ending October 30th, 29 fresh cases of plague and 16 deaths from the disease occurred in Mauritius.

## CHOLERA.

EGYPT.—During the week ending October 20th, 685 cases of cholera occurred in Egypt, against 819 in the previous week; of these cases 15 occurred in Cairo and 60 in Alexandria.

#### EXCHANGES.

Annali di Medicina Navale.

Archiv für Schiffs u. Tropen Hygiene.

Archives de Medicine Navale.

Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie.

Australasian Medical Gazette.

Boletin de Medicina Naval.

Boston Medical and Surgical Journal.

Bristol Medico-Chirurgical Journal. British and Colonial Druggist.

British Journal of Dermatology.

British Medical Journal.

Brooklyn Medical Journal.

Caducée.

Climate. Clinical Journal.

Clinical Review.

Giornale Medico del R. Esercito.

Hong Kong Telegraph.

Il Policlinico.

Indian Engineering.

Indian Medical Gazette.

Indian Medical Record.

Janus.

Journal of Balneology and Climatology.

Journal of Laryngology and Otology.

Journal of the American Medical Association.

La Grèce Médicale.

Lancet. Liverpool Medico-Chirurgical Journal.

Medical Brief.

Medical Missionary Journal. Medical Record.

Medical Review.

Merck's Archives.

New York Medical Journal.

New York Post-Graduate.

Pacific Medical Journal.

Polyclinic.

Public Health.

Revista de Medicina Tropical.

Revista Medica de S. Paulo.

Sei-i-Kwai Medical Journal.

The Hospital.

The Northumberland and Durham Medical Journal.

Treatment.

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4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the

5.—Correspondents should look for replies under the heading "Answers to Correspondents.

# The Journal of Tropical Medicine.

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### Original Communication.

# ADULT FORM OF FILARIA DEMARQUAII. By C. W. Daniels, M.B., M.R.C.S.

Two specimens of female adults of the filarial embryos known as *Filaria Demarquaii* were presented to the London School of Tropical Medicine by Dr.

Galgey, of St. Lucia.

He found them in the body of a native of St. Lucia in the connective tissue of the mesentery. There were five worms found, all females. Two of the other specimens have also been examined by me. These worms present the usual appearances of the human filaria whose embryos circulate in the blood. They are long, thin worms, with an unarmed head and terminal mouth. The genital opening is near the head and is single. There are two ovarian tubes terminating together in a pouch-like uterus. The alimentary canal is nearly straight and terminates in an anus which is subterminal. The opening of the anus is marked by a slight papilla.

The worms were fairly uniform in most of their measurements and in the shape of the cephalic and caudal extremities, and were sexually mature. In all the specimens there was the marked cuticular

thickening covering the tip of the tail.

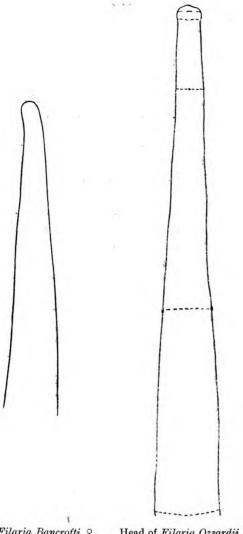
The comparative measurement of these female adults and of those of F. Bancrofti, F. perstans, and F. Ozzardi, are given in the subjoined table.

It will be seen from this table that Filaria Demarquaii is a thicker worm than Filaria perstans. It differs from Filaria Bancrofti and Filaria Ozzardi in the greater size of the head, in the smaller tail, and particularly in the marked cuticular thickening at the tip of the tail. This thickening is knobby, but the divisions are not so marked as in Filaria perstans. This cuticular thickening in other worms does not vary in life. In such other worms as have it, as

Filaria perstans and some of the bird filaria, it is constant, and it was present in each of the four specimens of Dr. Galgey's examined.

Some of the measurements of filaria, particularly those about the head, vary considerably in life, but as in these specimens the head has not got the globular form which is characteristic of the retracted head the measurements cannot be taken as indicating the extreme measurement.

			Adult Females	
	Filaria Perstans	Filaria Bancrofti	Filaria Ozzardi	Filaria Demarquaii
	Mm.	Mm.	Mm.	Mm.
Length	70-80	85-90	81	65-80
Greatest thickness	.12	.2—.26	-21	·21—·25
Diameter of head	.07	.055	.05	.09—.1
Distance ofgenital pore from head	•6	·66—·75	•71	•76
Diameter atgenital pore	•07	·14	•12	'1
Distance from tail of anal papilla	.145	•225	•23	•25
Diameter at anal papilla	.05	-1	.075	.07
Character of tail	Curved. Double terminal cuticu- larthick- enings	Bluntly trunca- ted. No cuticu- larthick- ening	Bluntly truncated. Slightly bul- bous. No cuticular thickening	Curved. Rapidly diminishes in size just below an al papilla. Cuticular thick- ening over tip of tail.
Diameter near tip of tail, before ter- mination	·02	•06	·045	.03

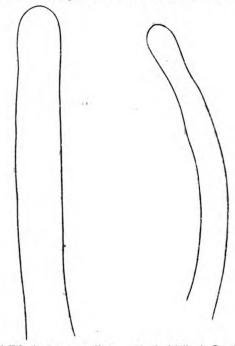


Head of Filaria Bancrofti,  $\circ$ . Head of Filaria Ozzardii,  $\circ$ . (Dr. Ozzard's case.)

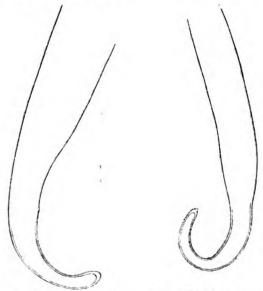


Tail of Filaria Bancrofti, ?. Tail of Filaria Ozzardi, ?.

The specimens had been mounted by Dr. Galgey in glycerine jelly and were in excellent condition, showing no signs of distortion. There is a previous description\* of this worm by Dr. Ozzard from a specimen received from Dr. Galgey, but as in that case the worm was much distorted the measurements were considered by Dr. Ozzard to be unreliable.



Head of Filaria Demarquaii,  ${\mathfrak P}$  . Head of Filaria Perstans,  ${\mathfrak P}$  . (Dr. Galgey's case.)



Tail of Filaria Demarquaii, ♀. Tail of Filaria Perstans, ♀.

There can, I think, be no doubt that this is distinct from Filaria Ozzardi, though the embryos of the two are indistinguishable in the dried and also, according to Dr. Low, in the living condition.

\* British Guiana Medical Annual, 1902.

Of the Filaria Ozzardi only a single female and an incomplete male have so far been found. The male of Filaria Demarquaii has still to be found. The adult form of the female Filaria Ozzardi more closely resembles Filaria Bancrofti than Filaria Demarquaii, the males of the two differ more markedly, and as in the case in which the Filaria Ozardi were found there were no embryos of Filaria nocturna in the blood, there can be no doubt that it was not a specimen of Filaria Bancrofti.

Diagrams showing the size and shapes of the cephalic and caudal extremities of these worms with exactly the same magnification are appended. With the exception of the tail of Filaria Bancrofti and the head of Filaria Ozzardi they are taken from photographs of undistorted specimens. These two, however, are reconstructed from measurements made on the fresh worms. The head of the Filaria Bancrofti photographed is in its most extended position and therefore unusually small.

A NEW METHOD OF STAINING THE MALARIAL PARA-SITES, WITH A DESCRIPTION OF THE STAINING RE-ACTIONS -C. F. Craig uses the following solutions: Solution A.—A saturated aqueous solution of methyl violet B. This solution should be prepared with distilled water and should be at least three weeks old. Solution B.-A 5 per cent. solution of eosin. The method pursued in staining specimens is as follows: Very thin blood smears are made upon perfectly clean cover-glasses. These smears are hardened in absolute alcohol for from five to ten minutes. They are next carefully dried and stained with solution A for ten seconds; then thoroughly washed in water and stained with solution B for from three to five seconds. The specimens are finally carefully dried and mounted in Canada balsam. As will be seen, the time for staining is very short, which is an improvement over the valuable methods which have heretofore been proposed. The following precautions are to be observed: (1) Both staining fluids should be prepared with the Grubler colours; (2) The methyl violet solution should be at least three weeks old. (3) The smears should be thin and the blood evenly distributed over the cover-glass. In thick smears the colouring is very diffuse and the distinction between the corpuscles and parasites nearly obliterated. (4) The methyl violet solution should not be allowed to act longer than twenty seconds at the most, otherwise the staining is intense. (5) The eosin solution should not be allowed to act for more than five seconds, for the same reason. (6) The specimens should be thoroughly dried before mounting, and thoroughly washed and dried between the applications of the stains. The stain colours the red cells a uniform dark blue, giving to the infected red cells a peculiar and distinctive colour, enabling one to at once pick them out from the others. It differentiates protoplasm, nucleus, and chromatin.-New York Medical Journal, September 13th, 1902.

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THE

# Journal of Tropical Medicine

DECEMBER 1, 1902.

# THE BRITISH MEDICAL ASSOCIATION.

THE COLONIAL COMMITTEE.

THE Committee of the British Medical Association appointed to consider and advise upon Colonial medical matters have important duties to fulfil, if the members of the Committee take up the subject of the Colonial Medical Service seriously. The difficulty of carrying out any real work in connection with the several Committees hitherto appointed by the British Medical Association has been their want of continuity. The Committees were appointed for one year only, and although a Committee might be reappointed, more often than not it was dissolved, and a new set of men took up the work, not usually where the previous Committee left it, but well-nigh de novo.

It is impossible to deal with so important a matter as the Colonial Medical Service in three or

four meetings of Committee, for that is usually the number of meetings practically possible during one year. The views of the several members of the Committee are in all probability unknown to each other; and the ideas and objects of men representing the various Colonies may widely differ. The representatives of Crown Colonies have totally different objects in view to those representing the self-governing Colonies; and the Crown Colonies themselves vary so essentially in matters of election, promotion, payment, retiring allowance, &c., that but little advance is possible. Under these circumstances, it was scarcely worth while for a member of Committee to take up any one branch of the many problems that come up before the Committees of the Association, and to hope to get a practical result.

A Committee with a debatable question to deal with, or with one requiring the collection of evidence from out-lying parts of the Empire as obtains in both medical and ethical matters, should be granted a longer life than twelve months. The representatives of the colonies on a Committee may be changed in twelve months, or the Committee may even cease to exist and the medical men resident in distant colonies find that their opinions and conclusions gathered, it may be after careful investigation, are valueless, owing to the member of the Committee representing them being no longer a member of the Committee, or the Committee itself having been dissolved. It would appear to us that the work of many branches of the British Medical Association would be better carried on by Committees elected for three years, or until such time under three years as the work they undertook to do is accomplished. During the period of their existence such Committees should report from time to time to the Council the result of their work, and an annual report should be furnished to lay before the general meeting of the Association.

In some such way as this, interest in colonial medical matters may be kept up; but without such continuity of action in colonial or any other special branch of work, active interest in the Association is impossible.

At the same time it is essential that the

medical officers in the Colonial Service and in the colonies generally, should assist those willing to help them at home by sending in their recommendations and suggestions for the betterment of the Service, or for the closer association of the colonial branches with the governing body. Little advantage is seldom taken in the columns of the medical press of the space willingly granted the more distant members of the profession. Grievances we hear of; but no amount of patchwork can better a service like the Colonial Medical Service. A sop here, or a little more money or leave there, may pacify the claimant for the time being, but something more than that is wanted.

The only scheme before the profession is that of Surgeon-General Evatt's, to which we have often referred, but the medical officers of the Colonial Service have themselves given us no scheme on which to act. Surely from amongst them a "plan of campaign" can be evolved on which the Committee of the British Medical Association, now sitting, can act.

### TRYPANOSOMA IN THE BLOOD OF MAN.

WE publish a letter sent to the British Medical Journal and the Lancet, and appearing in their issues of November 22nd, concerning the notice which we published in the Journal of Tropical Medicine on November 1st, on "A Case of Trypanosoma in a European." We welcome criticism at all times, and we are obliged to the distinguished men who signed the letter for drawing our attention to what appears to be a subject of contention. We would have preferred had the letter criticising the article in question been sent direct to us, and we should have published it with pleasure. We do so now, however, and we also publish various other letters on the matter which we hope will definitely settle the subject of the discovery of the trypanosoma in man. In the JOURNAL OF TROPICAL MEDICINE for September 1st, 1902, page 270, we noticed Dr. Dutton's paper on trypanosoma read at the meeting of the British Medical Association in Manchester. We regret that at the time we did not notice that Dr. Dutton's paper referred to a patient of Dr. Forde's, and that we were publishing in the same issue the original account of this case by Dr. Forde himself.

Dr. Dutton proposes to name the trypanosoma of man the *Trypanosoma gambiense*; but as this parasite was discovered several years ago by Nepvew in Algeria, and as a name indicating locality is in time likely to prove inadequate, we would suggest that the parasite be named after its discoverer, *Trypanosoma Nepvewi*.

Letter which appeared in the British Medical Journal and the Lancet of November 22nd, 1902.

# NOTE ON THE DISCOVERY OF THE HUMAN TRYPANOSOME.

Sirs,-We have recently seen in the medical press several very inaccurate accounts regarding the authorship of the important new discovery of trypanosomes in human blood, and of the disease caused by them. For instance, the JOURNAL OF TROPICAL MEDICINE for November 1st, in giving an anonymous description, supported by an editorial, of a case just observed by Drs. Daniels and Manson, attributes the original discovery to Dr. R. M. Forde. It does not mention even the name of Dr. J. Everett Dutton. Dr. Dutton is an old student and assistant in this laboratory, and is now away on the West African Coast, and we are of opinion that he has a claim to be considered in the matter of this discovery. Another periodical, the Hospital, for November 8th. p. 1902, while also omitting Dr. Dutton's name, states that the discovery was made "within the last few days" by the London School of Tropical Medicine. We believe that such statements are calculated to distort the history of the discovery, and should therefore like to have an opportunity for correcting them promptly in your pages

The facts regarding the history of the discovery—which was made nearly a year ago—have already been publicly and adequately stated both by Dr. Forde\* and by Dr. Dutton.†

Dr. Forde, Colonial Surgeon, British Gambia, tells us that the case in which the parasites were first observed came under his notice in May, 1901; that he found in the blood "small worm-like, extremely active bodies which I pre-maturely pronounced a species of filaria," although this conclusion "became doubtful after repeated observations of the parasite": and that he showed the case in December, 1901, to Dr. J. Everett Dutton, then upon a mission of the Liverpool School of Tropical Medicine to Gambia, and that Dutton "at once recognised" the parasite "as a species of trypanosoma." Dr. Dutton's two papers corroborate these statements of Dr. Forde. After the recognition of the new organism, Dr. Forde gave the first records of the case to Dr. Dutton. Dr. Dutton it was, as Dr. Forde says, who recognised that the fever was of a peculiar undulant type; Dr. Dutton it was who positively excluded malaria as the cause of the symptoms; it was he who saw that those symptoms roughly resemble those of tse-tse fly disease and surra; it is he who has published accurate and able descriptions, drawings and charts of the parasites and of the case; and it is he who is now, with Dr. Todd, investigating the subject in West Africa for the Liverpool School of Tropical

Medicine.

Dr. Forde is undoubtedly deserving of great credit for his part in the matter, and we think his name should be associated with the discovery. But until Dr. Dutton was called in, he published no account of the case and did not recognise the nature of the parasite, nor the peculiarity of the symptoms. In order to made a discovery it is not sufficient merely to see an object; it is necessary also to recognise the nature of the object seen, and to publish accurate and adequate descriptions of it. For example, Virchow and others long ago saw the parasites of malaria without recognising their parasitic nature; but it is to Laveran, who did recognise their nature, that science gives the credit for the discovery of them. It is certain that Dr. Dutton was the first clearly to observe and to signal the existence of trypanosomes in human blood, and the first to give accurate descriptions of the new organism; and it is to him that science will give the principal credit for the new observation.

It seems to us particularly unfortunate that the JOURNAL OF TROPICAL MEDICINE should have so ostentatiously omitted the name of Dr. Dutton at the moment when it was engaged in giving great prominence to a case of Drs. Manson and Daniels, which, after all, would probably have escaped notice but for the previous work of Dr. Dutton. We may mention also—and this is another point which the JOURNAL OF TROPICAL MEDICINE appears to have forgotten—that before his depositure for Africa Dr. Dutton. his departure for Africa Dr. Dutton gave at this laboratory a detailed demonstration both of the parasite and the clinical features of the case to Drs. Manson and Daniels, and to one of the editors of the periodical referred to. The omission, then, appears to be due rather to want of memory than to want of knowledge. The JOURNAL OF TROPICAL MEDICINE also states that while the first case (namely, that of Dutton and Forde) was regarded only as a "curiosity," the "discovery of a second case" (namely, that of Daniels and Manson) "opens up a new field for investigation and elucidation," and so on. This view of the relative importance of an original discovery and of a mere confirmation of that discovery is somewhat novel. But the case of Drs. Manson and Daniels is not the second case at all. The second case-also discovered by Dr. Dutton-was that of a child in British Gambia.

It is unnecessary after what has been said to deal with the statement made in the *Hospital*. It affords, however, an instance of the curiously rapid manner in which such errors are often proported in the process.

are often propagated in the press.

We should note that Barron and Nepvew have also claimed to have found flagellates in human blood; but, as will be seen from their writings, their descriptions are so inadequate as to fail to convince us of the accuracy or even the nature of their observations.

We are, &c.,
RUBERT BOYCE, M.B., F.R.S.,
RONALD ROSS, F.R.C S., F.R.S., C.B.,
CH. S. SHERRINGTON, M.D., F.R.S.
Thompson-Yates Laboratories, University College,
Liverpool, Novemeer 18th.

From the "British Medical Journal," November 29th, 1902.
THE DISCOVERY OF THE HUMAN TRYPANOSOMA.

SIRS,—With reference to the letter on the above subject, published in the British Medical Journal of November 22nd, from which it would appear, among other things, that this discovery was only made less than twelve months ago, that in my case (the first) malaria was not excluded by me, and finally that I did not recognise the peculiarity of the symptoms, &c., in fact that I simply glanced at the parasite and thought nothing more about it, I wish to make the following statements:—

(1) This parasite was first seen by me in the middle of May, 1901, that is, three or four days after the patient came under my observation. This makes its discovery—if an ordinary medical man be permitted to use the word—to date from eighteen months ago, and not from less than a year.

(2) Malaria was absolutely excluded by me at the time (May, 1901), in consequence of which I made a complete change in my treatment of the case.

(8) I fully recognised the peculiar symptoms of the malady, and was convinced in my own mind that they were associated with the presence of the parasite I found. This fact I mentioned to a colleague at the time, and also to Dr. Dutton on his arrival at Bathurst, before the patient returned from sick leave.

(4) The original temperature chart, the first recorded of the case, taken by me, shows the peculiarity of the fever.

(5) I was quite aware at the time (May, 1901) that I had met with a new disease in man, and fully intended bringing it to the notice of experts in England, but pressure of general work prevented my doing so as early as I wished.

<sup>\*</sup> Forde, Journal of Tropical Medicine, September 1st, 1902.

<sup>†</sup> Dutton, Thompson-Yates Laboratory Reports, vol. iv., part 2, May, 1902; and British Medical Journal, September 20th, 1902, p. 881.

Had the patient informed me as requested, that he had presented himself for treatment at the Liverpool School of Tropical Medicine, I would certainly have communicated to the experts of that institution an account of the case and what I had seen in the blood.

(6) The general condition of the patient, the persistency and novelty of the symptoms, together with the unusual appearance, activity, &c., of the parasite found in his blood, made an indelible impression on my mind at the time.

The extraordinary point about this case is that although the patient was a month or longer under observation at Liverpool during the period he was on sick leave (invalided by me in May, 1901, returned to Bathurst in the following December) the parasite was never seen by the observers, as, according to the temperature chart recorded it must have been present some time or other.

It is stated in the letter referred to above that the case of Drs. Manson and Daniels would probably have escaped notice but for the previous work of Dr. Dutton, I hope it will not be forgotten that the first case would equally probably have escaped the notice of the latter gentleman but for the previous observations, and conviction, as to the novelty of the morbid conditions found, of yours, &c., R. M. FORDE.

Worthing, November 22nd.

Senior Medical Officer, Gambia Colony, W. Africa.

SIRS,—We, the undersigned students of the London School of Tropical Medicine, are wishful to animadvert on the letter of Messrs. Boyce, Ross and Sherrington in the British Medical Journal of November 22nd. We feel indignant at the tenour of the letter, which, by implication, asperses Drs. Manson and Daniels with filching the credit due to other men for their discoveries, and we shall prove hereby how unjust it all is. Briefly put, the case is as follows:

A patient has been resident for some time in the Tropical School Branch of the Seamen's Hospital. Dr. Manson very early, from the patient's symptoms, inferred the presence in the blood of the trypanosoma, and communicated to all of us in the course of his routine visits to the wards his conviction that the parasite would eventually be found. In the laboratory, accordingly, Dr. Daniels made careful daily examinations of the blood, and eventually was successful, and repeatedly so, in his quest.

On the day on which the parasite was first found it fell due that Dr. Manson should lecture in due course. He did so, and began by referring to the case, first clearing the ground by disclaiming all originality on his part. He told us that it was a case, the clinical features of which had been demonstrated to him at Liverpool, which had put him on the track of the cause of the one under dispute. He recounted to us clearly the work which had been done at Liverpool in connection with the parasite, told us how it had been demonstrated in the human blood in more than one case by more than one observer, and above all, did full justice to the Liverpool School.

Dr. Daniels, in the laboratory, accorded the same full

acknowledgment to the Liverpool School.

You will see, therefore, that in giving all this information to us who will shortly be carrying the facts to all parts of the Empire, these two gentlemen did anything rather than try to filch the credit due to other men for their discoveries. Of course, though some of us can, we cannot all affirm that Mr. Forde and Dr. Dutton were mentioned by name; for men home on leave, snatching information in a hurry, are more concerned with facts than with names, and are very prone to cast aside the latter as useless lumber-this with the fullest respect for scientific pioneers. Could Drs. Manson and Daniels have done more?

All the above notwithstanding, we are all proud of the present case; for we believe that the utilising of the facts gleaned from the Liverpool case by Dr. Manson, in so confidently postulating the parasite in the present case, from the clinical facts alone, is quite in keeping with his

reputation.
"Tantæne animis cælestibus iræ?" which may be freely interpreted: Don Quixote was not the only free companion

who tilted at windmills.

We are particularly sorry to see appended to the letter the name of Major Ronald Ross, for hitherto, in our estimation, he and Dr. Manson have always stood together in our list of medical worthies; and we trust that we shall never again see anything in print which may lead to the suspicion of discord between the two.

We are, &c., J. LUNN C. J. BAKER, R. A. BELILIOS, G. Hood, E. LANGLEY HUNT, WILLIAM FLETCHER, G. IVANHOE LECESNE, M. E. O'DEA, TAYLOR HANCOCK, RAOUL F. DE BOISSIÈRE, GEOFFREY HUNGERFORD, AUBREY H. DAVIES. M. CAMERON BLAIR. EMMELINE DA CUNA,

London School of Tropical Medicine, Royal Albert Dock, E., November 22nd.

To the Editors of the Journal of Tropical Medicine.

Sirs,—Being responsible for the reference to trypanosoma which appeared in your issue of November 1st, I feel that it is my duty to answer the very formal protest advanced against it in the Lancet of 22nd inst., by Prof. Rubert Boyce, Major Ronald Ross and Prof. Sherrington, These gentlemen's protest has surprised me in the extreme, and I am bound to say that, even now, I am unable to grasp the real motive which prompted their letter. Anyhow, I will suppose that they considered my communication an encroachment on their rights of priority similar to that which was unfortunately made soon after Dr. Low's demonstration at the London School of Tropical Medicine, that the larval Filaria bancrofti, having reached a certain stage of development in the thoracic muscles of Culex fatigans, migrates to the insect's trophi to be subsequently inoculated into a fresh human host.

Had my communication been so devised, it would not yet have been a parallel case, because I sent it to a wellinformed medical journal, whilst their notification appeared

in the first instance in the lay press.

Anyone who will read my communication with an unbiassed mind, will, I am sure, be unable to see adequate reason for their protest. I did not attribute the discovery of the presence of trypanosoma in man either to Dr. Manson, or Dr. Daniels, I simply stated that Dr. Manson, having had the opportunity of examining Forde's patient in Liver-pool (already described in this Journal a few weeks previously), was able to diagnose a second case which was subsequently studied at the London School of Tropical Medicine, and that Dr. Daniels had found, and of course recognised, the trypanosoma just as Dr. Dutton had recognised the nature of the parasite found by Dr. Forde in his case.

Further, I added that the presence of trypanosomes in a second case presenting the same striking and grave symptoms observed in Dr. Forde's patient, showed that the presence of trypanosomes could no longer be regarded as a mere curiosity like many erratic parasites occasionally found in man, but must be looked upon henceforth, in certain regions, as an important pathological factor.

I did not sign my hasty communication, because its object was not that of advertising my name, and I stated that an accurate account of the case would be published

very shortly by those who were investigating it.

I did not mention Dr. Dutton, because it did not occur to me that he had anything whatever to do with the case I was reporting, and even now I utterly fail to see why I should have mentioned his name. In other publications on filaria, &c., I have, at opportune times, mentioned Dr. Dutton's

excellent work. In this instance, I was not writing in praise of the Liverpool School; that has been done lately to a large extent. I was merely mentioning an interesting case of trypanosoma infection.

Having explained the reason of my anonymous communication, I must now myself protest against the very gratuitous accusation brought by Drs. Boyce, Ross and Sherrington,

when they say :-

"We believe that such statements are calculated to distort the history of the discovery and should therefore like to have an opportunity for correcting them promptly in your

pages."

These gentlemen virtually accuse me of having attributed trypenesoma in man to Drs. the discovery of the presence of trypanosoma in man to Drs. Manson and Daniels, a statement which I did not make, nor ever dreamt of making. But what is still more surprising is that while they accuse me of distorting the history of this discovery they ascribe the honour of having made it to "an old student and assistant" of their laboratory!

I am sorry that Major Ross, who has so strongly resented

Prof. Grassi's encroachments on his work, should now set aside information of which he is evidently aware, even for the purpose of claiming for his own school the discovery of

trypanosoma in man.

Major Ross and his colleagues, after having stated that "Dr. Dutton was the first clearly to observe and to signal the existence of trypanosomes in human blood, and the first to give accurate descriptions of the new organism," add, without mentioning dates, and in the most unfair manner: "Barron and Nepvew have also claimed to have found flagellates in human blood, but as will be seen from their writings, their descriptions are so inadequate as to fail to convince us of the accuracy or even the nature of their observations" [the italics are mine].

To disprove these erroneous statements I can do no better than quote verbatim Dr. G. Nepvew's very clear account of his discovery of trypanosomes in man, which, be it noted, he made between 1890 and 1898, and published in the Comptes rendus des séances de la société de Biologie, on December 24th, 1898, many years before Dr. Dutton's publication. Dr.

Nepvew writes as follows:—
"Trypanosomes have been observed only in the blood of animals; in India they have been found in the blood of rats (Lewis), horses (surra epidemics), dogs and domesticated elephants. In Africa they have been discovered in the disease caused by the tse-tse fly, and in Europe in the blood of rats, rabbits, birds and frogs."

"No one seems to have found them so far in man; however, Laveran (1) states that Barron seems to have found every flowed that the protection of any letter of the collected protection o

certain flagellated protozoa of undetermined genus in the blood of an anæmic woman."

"In 1890, in consequence of researches made in Algeria on the malaria parasite, I have found, in the blood of a patient, besides Laverania, a flagellate which seemed rather common, because I could count about three in each preparation of 18 square millimetres. At about that time (See Nepvew, Etudes sur les Parasites du sang chez les paludiques, 21, 1891, in Bulletins et Memoires de la Société de Biologie), I already published some of the drawings I had so far collected. I then hoped I might complete my first observations by a more detailed study, but since that time only very rarely have I been able to find that parasite. I have therefore decided to publish the following facts in the hope of drawing the attention of those naturalists and physicians who will have the opportunity of completing these researches."

"This trypanosoma presents all the characters of the genus: general shape a homogenous colourless membrane, one border of which is thinner, hyaline, and presenting characteristic undulating movements. This membrane bears a nucleus and a fine flagellum placed anteriorly; the undulations of the latter follow in rapid succession.'

"Thus it presents itself in the patient Khill (quotidian fever), in Cabane (pernicious comatose fever); in a third

patient, Ginestet, I have found certain organisms which I thought I might compare to those described under the name of Trypanomones, a form which is probably only an evolution stage of the trypanosome. In this patient the organisms were provided with two flagella at one of their extremities. Labbé has described such trypanomones."

"On over two hundred patients, mostly malarial, of which

I have examined the blood, I have only found these various forms in six. Three of these were suffering from quotidian fever (Khill, Langevelde, Bichielli), one a double tertian (Hendrick), two the pernicious comatose fever (Cabane and Ginestet); the seventh observation was on Dr. X., who was apparently

in good health."
"In none of these patients have I been able to observe any symptoms characteristic of this special parasitic invasion. They were almost every one of them suffering from the effects of Laverania which prevailed on all and everywhere in its various forms. This seems therefore purely and simply a coincidence which has seemed to me

worthy of notice.

"In conclusion, the trypanosome must be classed amongst the parasites of human blood. I am unable at present to give with the necessary precision a more complete description of this variety, I therefore abstain from giving it a It is better to establish in the first place the special name. analogies and differences which I perceive between this parasite of man and the congeneric parasites in animals, and also to complete the observations on its morphology and life history."

The above quotation speaks for itself, and I will only add that there can be no question about Dr. Nepvew's bona fides. The two-flagellated organism he mentions in his paper is so peculiar a feature that it is not likely to be imagined. That it is a feature of the trypanosoma of man I can attest, because Dr. Daniels found it in the blood of our patient.

It is to be regretted that the representatives of the Liverpool School of Tropical Medicine, in their praiseworthy endeavour to make a new discovery, should have overlooked

previous work.

Your obedient servant, Louis W. Sambon, M.D. (Naples). Lecturer to the London School of Tropical Medicine.

### British Medical Association.

### NOTE ON A TRYPANOSOMA OCCURRING IN THE BLOOD OF MAN

By J. EVERETT DUTTON, M.B. Vict. Walter Myers Fellow, Liverpool School of Tropical Medicine.

WHILE staying at Bathurst, Gambia, last year, for the purpose of investigating the sources and distribution of mosquitoes in the town on behalf of the Liverpool School of Tropical Medicine, I was asked by the Colonial Surgeon, Dr. R. M. Forde, to examine the blood of one of the Government officials who had just returned from England, having been invalided home six months previously, after an attack of "fever' which had proved quite resistant to treatment with quinine. In the blood of this man I found a flagellated protozoon evidently belonging to the genus Trypano-The clinical history of the case is as follows:-

Mr. K. is an Englishman, aged 42, who has been for the past seven years in Government employ, with intervals of leave, as master of the Government boat plying weekly up the River Gambia. His illness dates back to May, 1901, when he broke down after the especially heavy duty occasioned by a punitive expedition up the river. Previous to that time he had enjoyed good health, except for very occasional slight attacks of malarial fever which were amenable to quinine. On May 10th, 1901, he was admitted to the hospital at Bathurst with fever, under the care of Dr. Forde, who very kindly gave me a copy of the temperature chart (Chart I.).\* Fresh preparations of the patient's blood were examined at that time; no malaria parasites were seen, but Dr. Forde informed me he saw many actively moving worm-like bodies, the nature of which he was unable to ascertain. On June 1st, after three weeks in hospital, the patient was invalided home, and on August 12th admitted to the Royal Southern Hospital, Liverpool, under the care of Dr. Macalister, to whom I am indebted for some notes on the case. At this time his chief troubles were general weakness and pain in the left side.

The chief features presented by this case during his stay in the Royal Southern Hospital were as

follows :-

The temperature, which on admission was subnormal, was marked throughout by slight rises above normal, and three more important elevations to  $101^{\circ}$  to  $102^{\circ}$ , lasting a few hours and rapidly falling to normal. The pulse—on admission 120—fell in the evening to 92; the pulse-rate continued always fairly rapid, at about 100 per minute, and increased with the slightest exertion.

The respiratory rate was also similarly increased, being 32 on admission, falling later on to 20 per

minute, and afterwards keeping about 25.

The liver showed slight enlargement, and the spleen, described as being normal on admission, could afterwards be felt below the ribs, and was then very painful; there was throughout considerable tenderness over the splenic area.

Beyond some slight dyspnœa on exertion the respiratory system was apparently normal. The heart sounds were weak and distant. Patient often com-

plained of weakness in the legs.

The blood was examined for malaria parasites on

two different occasions, but none were found.

Patient left hospital improved, the pain over the spleen having disappeared. After recuperating, he returned to Bathurst in the early part of December, 1901. During the voyage out he had a severe illness which was diagnosed by the ship's surgeon as an atypical attack of pneumonia. On landing at Bathurst it was generally remarked that he was very much thinner and easily fatigued. He was placed on the sick list, but his condition did not necessitate admission into hospital. Dr. Forde and myself made an examination of the patient on December 18th. We found his temperature 100.4°, pulse 96, respiration 34. ness of the legs and a little breathlessness on exertion were the chief troubles complained of. There was also a little loss of appetite and sleeplessness at times. On December 16th he had had a slight bleeding from the nose.

The general facial aspect, which has been remarked

upon by his friends, attracted our attention. The face was distinctly puffy and flushed, the eyes appeared sunken, and the conjunctive watery; there was a distinct fulness of the lower eyelids, which were found to pit on pressure. On examining the body generally the skin was distinctly congested in places, especially the chest and thighs; there were seen irregularly scattered, purplish coloured areas, due to a localised congestion of the superficial capillaries; after pressure with the finger in these regions the purplish colour only very slowly returned.

Around the ankles there was some ædema, the skin in this region pitting on pressure. A systematic examination of the various systems was made, but nothing abnormal was detected with the exception of distinct enlargement of the spleen, which organ could easily be felt below the costal margin; dulness measured diagonally 7 inches; a slight bulging was noted over the splenic area. The temperature, pulse, and respirations (Chart II.)† during the time patient was under observation were very similar to the previous records; from the charts it will be seen that the temperature recorded was never very high, as a rule not much above 101°. The course of the temperature was rather irregular, but of a distinctly relapsing type, thus showing a characteristic of the temperature charts of such animals as the ass and mule infected with surra or nagana, which diseases are known to be associated with the presence of a trypanosoma in the blood. Also as seen in these animals, the number of parasites encountered in the blood was found to vary with the temperature—thus, from December 16th to December 18th, when the patient's temperature was raised, parasites were found in the blood, the largest number counted in fresh preparations being fifteen under a 3-inch square cover-glass. On December 19th the temperature fell below normal, and on that and subsequent days no parasites were detected, but they reappeared about December 27th during a fresh attack of fever.

The patient's condition improved during the week which he spent at the Cape, seven miles from Bathurst, at the mouth of the Gambia River, where there is an excellent Government House facing the sea. He afterwards was allowed to resume his duties, and took the Government launch up river on January 5th,

1902.

The most notable features presented by this case were:—

(1) Its chronic course.

(2) The general wasting and weakness.

(3) The irregular rises of temperature, never very high, and of a relapsing type.

(4) The local ædemas.

(5) The congested areas on the skin.(6) The enlargement of the spleen.

(7) Constant increased frequency of pulse and

respiration (hurried breathing).

This condition still persists; the general weakness has increased, in consequence of which the patient has been again invalided home, and arrived in England a few days ago.

<sup>\*</sup> For Chart I. see Dr. Forde's article in the JOURNAL OF TROPICAL MEDICINE, September 1st, 1902, page 262.

<sup>†</sup> For Chart II. see Dr. Forde's article in the JOURNAL OF TROPICAL MEDICINE, September 1st, 1902, page 262.

THE PARASITE OBSERVED IN THE BLOOD.\*

Although many slides were made and fresh preparations of the blood examined throughout the time the patient was under observation, no malaria parasites were discovered. The first examination of the blood was made on December 15th. On that day I made three fresh preparations, using a \( \frac{3}{4} \)-inch square coverglass. In these preparations I observed altogether three parasites, presenting all the characteristics of the trypanosomata.

In fresh blood the parasite appears as a very minute worm-like organism, very difficult to see with a magnification of 300 diameters; especially in this case, when only a few are present in a preparation, and the parasite is entangled amongst a clump of red corpuscles; it glides along fairly rapidly in among the red cells, imparting very little movement in them. When the movements have slowed down one end of the organism is seen to be drawn out into a whip-like process—the flagellum; the other end is bluntly conical; attached along one side of the body is a transparent flange-like process—the undulating membrane; the body itself is short and thick, and its substance granular. There is a highly refractile spot situated near the posterior end (vacuole).

The parasite usually is seen progressing with the flagellum, which represents the anterior end, in front, but at times when an obstruction is insurmountable it shoots backwards for a short distance with the blunted end (posterior) forward. Progression is brought about by wave-like motions started in the flagellum and communicated along the undulating membrane, also by contractions of the body protoplasm. The parasite in rapid motion moves in a screw-like manner, its body rotating around the longitudinal axis, so that the undulating membrane appears as if it were spirally arranged around the organism.

On one occasion I observed the process of phagocytosis take place on a slide one hour after the blood was drawn; a mononuclear leucocyte had partially englobed the trypanosome, only the flagellum and a small portion of the anterior part of the body remaining free.

In fresh preparations, ringed with vaseline, the parasites appear to die in a few hours after the blood is drawn (one observation three hours). In such preparations, left over night, I was never able to find the trypanosoma again in the morning. Atmospheric temperature varied from 90° in the day to 65° during the night. I was unable to obtain an exact measurement of the parasite in the fresh state.

Blood films were stained by a modification of the method of Romanowsky for chromatic staining which had been devised by Dr. MacConkey, to whom I am indebted for the formula. (Dr. MacConkey, I understand, will describe his method at an early date.)

The length of the parasite, in stained preparations, including the flagellum, varied from  $18 \mu$  to  $25 \mu$ . In preparations which were taken on December 16th (first observation) the parasites appeared somewhat longer than those taken when they appeared in the blood again on December 27th; the majority of

specimens measured 22  $\mu$ ; the width was 2  $\mu$  to  $2.8 \mu$ . This width, when compared to the other trypanosoma, is distinctly greater in proportion to the length.

The flagellum stains a light crimson, and can be traced from the anterior end of the organism along the outer margin of the undulating membrane, and appears to end near the refractile spot seen in fresh preparations; it sets in small curves along the body, and there is always present a dip opposite the nucleus. The free part of the flagellum is about one-third that of the total length, but it is difficult to say where the anterior part of the body ends and the flagellum begins. One can always see a narrow streak of protoplasm, staining blue, for some distance beneath the free part of the flagellum.

The posterior end of the organism ends abruptly and is roughly conical, in most specimens with the point of the cone cut away on the side remote from the undulating membrane.

The undulating membrane is a narrow unstained band, somewhat wrinkled, attached along one side of the animal; in stained preparations it sometimes takes on a faint pink colour.

The nucleus (the macronucleus of Plimmer and Bradford) is situated a little anterior to the middle of the body, in some specimens occupying the whole width of the animal; it is oval in shape, and stains dark crimson, due to an aggregation of chromatin granules

Generally about  $2.5~\mu$  from the posterior end is a dark purple spot, well marked, showing no definite structure; this is the centrosome (Laveran and Mesnil), or micronucleus (Plimmer and Bradford). The flagellum is intimately connected with the micronucleus. Anterior to it there is a large clear spot (vacuole) which does not stain; the vacuole in all the specimens is well marked.

The protoplasm does not stain evenly; it takes on a basophile reaction, and in it in some specimens are fine blue-stained granules situated chiefly around and in front of the macronucleus. The organisms "set" in a characteristic manner on a slide, the body is generally bent at an angle opposite the nucleus. I have observed this in most of the stained preparations; whether it is a distinguishing feature or not is difficult to decide, but it is curious to note in film preparations the body of T. lewisi does not bend but sets in a crescentic manner; in the case of T. brucai the body makes three or four curves.

I have not observed dividing forms in any of the slides made. The blood in this case showed no very marked anæmia, the red corpuscles numbered 3,850,000 and white corpuscles 12,000 per c.mm.

A differential count of white corpuscles was made on several occasions when the parasites were present, and when few or none could be detected in the blood. On all occasions the counts showed an increase of lymphocytes at the expense of the polynuclear leucocytes, the relation being generally about 50 per cent. of the latter to 40 per cent. of the former.

I have examined a series of 115 blood films obtained from native children (aged 1 to 15), for the purpose of estimating the prevalence of endemic malaria in the Gambia.

In one preparation of blood taken from a child,

<sup>\*</sup> See plate illustrating Dr. Forde's article in the Journal of Tropical Medicine, September 1st, 1902,

aged 3 I found trypanosomata present. In the smear three parasites were counted, presenting identical characteristics—size, shape, staining reaction, and position taken up on the slide—to the parasite described occurring in the blood of the European; associated with the trypanosomata were a few ring forms of malaria parasites.

The child was one of a batch of fifty examined at a native village seven miles from Bathurst, near the mouth of the River Gambia; these children were to

all appearances healthy.

Up to the present time four previously well-known diseases occurring in lower animals in various parts of the world have been shown to be associated with the presence of trypanosomes in the blood. These are:—

(1) Surra, the organism of which was discovered by Dr. G. Evans in 1880, in horses and other animals in India, North-West Provinces.

(2) Nagana, in Central Africa and in other parts, attacking horses, cattle, and other animals. Bruce

discovered the parasite in 1894.

(3) Mal de Caderas, in Central South America and Brazil: the disease is very similar to surra and nagana, and is produced by a trypanosoma probably identical with that of *T. brucei*.

(4) Dourine, or Maladie du Coït, occurs in Algeria, South France, Spain, and Turkey, the pathological agent of which is the *T. equiperdum* (Doflein), *T.* 

rougeti (Laveran).

In February of this year Lieutenant-Colonel Bruce reported a discovery by Dr. Theiler of a new trypanosoma which is pathogenic for cattle in the Transvaal. Horses, dogs, goats, rabbits, and guinea-pigs appear immune.

Comparing the symptoms which have been described in animals suffering from these diseases with those which I have observed in the patient during the short time he has been under observation, they appear to

have many points in common, namely:-

(1) The chronic course of the disease. The illness in my case has already lasted fifteen months. In cattle, sheep and goats nagana runs a chronic course of some six to eight or more months. In cases of surra in cattle and of dourine in horses, the respective disease may last a similar length of time.

(2) In all animals infected with a pathogenic trypanosome marked cachetic symptoms are characteristic. The present case during the fifteen months

has lost 26 lbs.

(3) The gradually increasing weakness, especially in the legs and arms, in this case correspond to that most striking symptom which gives to Mal de Caderas its name; loss of power and paresis progressing to paralysis are present also in surra and nagana.

(4) Localised and fugitive edemas occur in all the animal affections. I have already remarked their

occurrence in the present case.

(5) Some pathological condition of the small vessels and capillaries giving rise to congested patches, petechiæ, and hæmorrhages are often associated with other symptoms in animals. The peculiar condition of the skin and the bleeding from the nose I have already referred to in the description of the symptoms of this patient.

(6) A peculiar tendency to a relapsing type of fever is shown by the temperature charts of many infected animals, especially those in which the disease assumes a more chronic course, and also has been noted in the human affection. As far as my observations go there appears to be also a relation between the presence of the parasites in the blood and the elevation of temperature similar to that which has been described in nagana and surra.

In contrasting the parasites with similar parasites in animals it approaches most nearly in its morphology the T. brucei. It is the smallest of all described mammalian trypanosomata; its average length is  $22 \mu$  including the flagellum; its breadth is greater in proportion to its length than in other parasites. The posterior part as measured from the micronucleus to extreme tip is short and characteristic for this

parasite.

The micronucleus and its associated vacuole are always large and well marked. The "set" in fixed specimens differs from that of other species as has

already been pointed out.

Dr. Laveran, who has very kindly examined some blood films taken from the patient, informed me that if the morphological characters are alone considered he would regard my specimen as a new species, it differs from *T. brucei* in the length of the flagellum and by the small number of chromatin granules in

the protoplasm.

Having as yet not had the opportunity of transferring the parasite in the blood from man to other animals as has been so completely done in nagana by Bruce in Africa; Kanthack, Durham and Blandford and Plimmer and Bradford in England; Laveran and Mesnil in France; and to a less extent in surra by Evans, Steel, Lingard, Vandyke Carter; and in dourine by Rouget, Nocard, and others, I am quite unable to contrast the pathogenicity and the morphological appearance of the human parasite in lower animals with the other species. It is to be remembered that no case has ever been recorded in man in the districts in which animal infection is so common, although man is exposed to the same risk of infection; for instance, the tse-tse fly (Glossina morsitans, Westwood), which was proved by Bruce to carry the infection of nagana from animal to animal, bites travellers, natives and others, as well as animals.

The consideration of these facts and the discovery of a parasite—evidently of the genus trypanosoma—in the blood of a patient presenting symptoms markedly similar in very many points to those of the two or more diseases of lower animals which have been definitely proved to be caused by the presence of different species of the genus trypanosoma forces one to the conclusion that the parasite found in this patient is a new species, and is also the cause of the disease from which the patient is suffering. I would therefore suggest that the name of Trypanosoma gambiense be given to this trypanosoma.

In conclusion, I wish to take this opportunity of thanking Dr. Forde, who kindly allowed me to investigate the case at Bathurst, Dr. Laveran, Lt.-Col. Bruce, Dr. Plimmer, Dr. Rose Bradford, and my colleagues at the Liverpool School of Tropical Medicine for the great interest they have shown, and for

many suggestions. I am indebted also to Dr. Annett, who has kindly promised to undertake the investigation of the case on my departure to West Africa.

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### Translation.

### TSE-TSE DISEASE IN TOGO (WEST AFRICA).

By Dr. HANS ZIEMANN, Naval Staff-Surgeon. (Translated from the German by P. Falcke.)

AT the commencement of June, 1900, my Governmental term of medical practice being concluded, I was, on my return journey, invited by the former Official Medical Officer of Little Popo, in Upper Guinea, Staff-Surg. Bludau, to avail myself of the resources of the Nachtigal Hospital, and devote myself to the study of the diseases of Togo. accepted this invitation gratefully for a period of a month, so Dr. Bludau was in a position to follow the work with me. I was likewise considerably assisted by the officials and merchants of Little Popo. Although my attention was principally directed to the investigation of the etiological conditions of malaria amongst the white population, and also the diseases of the natives, some attention was also directed to veterinary pathology. In this connection I succeeded in confirming the existence of Tse-tse disease in Togo, and only want of time prevented me from also approaching the question of the occurrence of Texas fever in Togo, as the ticks (Ixodidæ) which transmit the disease were observed by me in that

country. The possibility, or rather the great probability, of the occurrence of that disease in the hinterland of Togo and Cameroon are set forth in a report to the Colonial Department. At any rate, the occurrence of tse-tse in Togo was quite unknown to my attendants until the period of my visit. In Cameroon, however, the suspicion of the existence of tse-tse in Upper Guinea had already gained ground in consequence of the symptoms presented by horses from that district.

I now learned in Little Popo that a horse-disease developed in the hinterland of Togo when healthy horses were taken beyond the seventh degree of latitude. The district of Misa Heights is supposed to be afflicted very severely. One particularly characteristic sign was that in this disease a thick cord appears beneath the skin, which extended from the neck to the scrotum, from which when incised a fairly clear fluid exuded. The Haussas, the well-known commercial people of the hinterland of Upper Guinea, treated the disease with enemata and purgatives. When the animals were much reduced the Haussas were supposed to feed them forcibly by stuffing balls of millet (Durra) mixed with maize down their

At that time nothing more was known respecting the disease. My search for the tse-tse fly (Glossina morsitans) in Little Popo and vicinity was not attended by success; but it must be noted in this connection that being at that time engaged in the investigation of malaria, I seldom went beyond the lake. The natives also professed never to have even seen a fly answering to the description in Little Popo. Chance, however, provided the necessary material; a communication on this subject was laid before the Paris Congress, 1900,\* but did not appear to arouse further interest. In 1901 and 1902, Dr. Schillingt published some interesting researches on surra (synonym for tse-tse disease) in Togo. The author being permanently on the spot had plentiful material at his disposal, and his investigations are a valuable supplement to my discoveries, which, however, differ partly from his. Dr. Schilling's last essays also contain a hopeful outlook for the prophylaxis of this pestilence which is so fatal to cattle.

I cannot discover from Schilling's words if he had any knowledge of my researches, likewise conducted in the Nachtigal Hospital eleven months previously.

Here follow the notes made in his time: Case 1. June 27, 1900.—Terrier bitch, 4 years old, born in Europe, has been in Little Popo for

three years. Has never been ill previously; was brought to me by her master. The terrier had littered three months previously; has never been into the interior. One of her litter had died two

\* Zweiter Bericht über Malaria und Moskitos an der afrikan-ischen Westkuste. Deutsch. med. Wochenschr., 1900. Also Bericht uber die Sitzungen im Institut Pasteur in den Verhandlungen des Congresses zu Paris.

Dr. Schilling: (a) Bericht uber die Surra-Krankheit der Pferde. Centralbl. f. Bact. u. Th. Bd. xxx., 1901, No. 15. (b) Bericht uber die Surra-Kranheit der Pferde und Rinder im Schutzgebiet Togo. Centralbl. f. Bact. u. Th., Bd. xxxi., 1902,

months previously with the same symptoms as are described below. The remaining two puppies of the same litter are healthy. Until this morning the animal, which is always narrowly watched by her master, was apparently well. This morning the terrier was seized with vomiting and diarrhea. The food, as far as could be vouched for, had always been the same. The vomit and stool were asserted to have looked greenish. The temperature at 3 p.m., taken per rectum, was 38.20 C. The animal appears to be seriously ill. Respiration 44 per minute, heart beat 140. The bitch cannot stand, and when she tries to she falls on her side after rocking to and fro. No erythema of the skin; no œdema. Several tonic and clonic cramps of the head and limbs, which are, however, of short duration, never longer than one minute. Some mucus, which unfortunately was not examined, flowed from the nose and mouth. The pupils react to light. Reflex of the cornea maintained. There is frequent anguished howls, but only in the intervals between the convulsions. examination of the blood exhibits a remarkable number of parasites, which in their morphological appearance may be regarded as tse-tse parasites (description below). There is a slight degree of leucocytosis. A few red blood corpuscles exhibit metachromatic colouring. The following animals were inoculated subcutaneously, each with  $\frac{1}{3}$  ccm. defibrinated blood with \frac{1}{2} ccm. 0.6 per cent. sterilised solution: (1) One duck; (2) one cock; (3) one pigeon (tame); (4) one kid, a short-legged variety of the Togo goat; (5) one small black sucking-pig from the farmyard of a Ewe negro.

The blood examination of these animals exhibited no deviation from the normal excepting that of the pigeon, which contained a few halteridium. [Some blood of the terrier placed on agar-agar tubes.] The condition became worse at 6 p.m., the temperature was 39.80 C. The tonic and clonic convulsions became more frequent and unconsciousness supervened, the terrier lying on her side with eyes wide open and fixed. Death at 3 a.m. Obduction seven The histological examination is not yet concluded. Marked rigor mortis. The terrier is somewhat lean. A little saliva has dribbled from the mouth. No marks of bites on the tongue. No erythema and œdema in the skin. The conjunctivæ are of a dirty yellowish colour, very moist. The lymphatic glands are not enlarged. A few ecchymoses on the pericardium. The subcutaneous cellular tissue of the abdomen somewhat discoloured and is ædematous, infiltrated to a slight degree; the heart is not enlarged but is flabby. Muscles yellowish-brown, parenchyma dim. There are clots in the ventricles and auricles.

The lungs normal. No ecchymoses are observable on the pleura. No exudation into the abdominal cavity. Liver enlarged, reddish-brown in colour, somewhat harder than normal, permeated by a number of whitish-yellow spots from the size of a lentil to a pea; the smaller spots are differentiated sharply from the reddish-brown vicinity and are found to consist of altered hepatic tissue, in which no trypanosomes are present. Portal vessels full of them in parts.

The biliary capillaries are also very full. Kidneys not enlarged, of normal consistency. Capsule easily removable. Cortal substance opaque with striped reddening of the medullary substance. The urine taken from the bladder exhibits traces of albumen.

Slight parenchymatous gastritis. Intestines normal macroscopically. No ecchymoses on the serous membranes. Spleen slightly enlarged, chocolate-coloured, and of deliquescent consistency. No trypanosoma in streak preparations. Unfortunately the mammary glands were not examined.

Brain.—Slight hyperæmia of the cerebral vessels, meninges easily removable; otherwise no abnormalities macroscopically. Bone marrow from femur exhibits no peculiarities, no trypanosoma.

June 29.—Blood examination of the inoculated animals negative; all lively. No growth observable on the agar-agar tubes.

July 2.—Blood examination of the inoculated animals negative.

July 4.—Blood examination of the inoculated

animals negative.

July 5.—Halteridium unchanged in the pigeon. No trypanosoma in either the duck, cock, or pig. Growth on agar-agar tubes = 0. The kid exhibits a great number of trypanosoma in the peripheral blood resembling the trypanosoma of the dead terrier. The kid has become somewhat languid. Appetite slightly diminished. No paresis or convulsions. No glandular enlargements; no erythema or ædema. Temperature at 5.30 p.m., 41°.

July 7.—Temperature at 7 a.m. is 39.6°. The kid is fairly lively. Being taken on board ship the blood was not examined.

July 8.—Temperature at 7 a.m. is 39°. The kid is lively and enjoys its food. At first no trypanosoma can be found in the living blood. Two trypanosomes are found in stained preparations after a long search. At 6 p.m. temperature 39.6°.

July 9.—Temperature 39°. Still a large number

of trypanosoma in the blood.

July 10.—Temperature 38.4°. Still a large number of trypanosoma in the blood.

July 11.—Temperature 38.9°. Very few trypano-

July 12.—Blood examination gives negative results.

July 13.—Very few trypanosoma. The animal is very lively.

July 14.—Two trypanosoma found in four stained

preparations after a long search.

July 15, 16 and 17.—Blood examination negative.

July 19.—One trypanosoma found in preparation after a long search.

July 20 and 21.—Blood examination negative. The kid was sent to the Institute for Infectious Diseases in Berlin for the study of methods of immunisation, and after repeated blood examinations was pronounced healthy. The periodical variations in the occurrence of the parasites in the blood should be noted, they being most numerous on those days when the temperature was highest. In this respect the infection described above resembles the real surra as observed in India.

Case 2. June 28, 1900.—Bobbie, terrier, 4 years

of age, the property of Staff-Surgeon Bludau. Born in Europe, has been in Togo for three years, and during the last few months has always been in or near Little Popo. Hitherto has always been healthy.

During the forenoon the dog, usually a very lively animal, exhibits great fatigue and sleepiness, and does not eat. Indication of tonic, slight and rapidly transient, convulsions of the limbs; otherwise nothing abnormal. Temperature, 38.7°. Blood examination quite negative, and also on following day, when the animal has again become lively.

At first it was conjectured that both dogs were suffering from some malaria-like ailment—a sort of Texas fever—as  $Ixodid\alpha$  were found on another large dog, a St. Bernard, belonging to Dr. Bludau; these, however, could not be identified as unfortunately the

preparation was lost.\*

As long ago as 1894 I had succeeded in finding blood parasites in a pug on the West African Coast; morphologically these parasites resembled the parasites of tropical fever, and many forms of *Pirosoma bigeminum* are known to be hardly distinguishable from these. This dog had also died from convulsions.† This was long before Marchoux, in Senegal, made his discovery of corresponding blood parasites in the dog, being the first confirmation of malarialike parasites of dogs in the tropics.

In regard to Case 2, the clinical symptoms and the fact that, as we shall see, tse-tse may occur in a very mild form, lead one to conjecture that Dr. Bludau's terrier was also suffering from the disease.

Case 3.—Horse belonging to Mr. Keutzler, about 4 years old, has been in Little Popo, Togo, about three years, having been imported from Lagos. On June 27th it was reported that the horse has fallen off during the last two days; appetite not good and does not drink much. On the abdomen, proceeding from the penis towards the front, there is a flat thickening about 15 cm. in length and 3 cm. in breadth. The skin over it is immovable, the glans penis slightly ædematous. Œdema is not perceptible on the legs. Temperature per rectum 38·2°. At first no trypanosoma are observable in the living blood. In eight stained preparations examined in Europe, one and a half years later, two trypanosoma found after a long search.

On June 27th the horse is already better; on the 28th it is quite well again, and, according to news received by letter later on, it remained in good health.

Case 4.—Horse, the property of Mr. Schlapozek, 4 years old; has been in Little Popo two and a half or three years; formerly always healthy. His owner had made a four weeks' tour, concluded two days ago, to Topli in the hinterland of Togo. The tour was

On examination the horse was found to be in poor condition. Temperature 39.6°. The hind legs were found to be ædematously swollen. Blood examination of the living blood negative. The examination was very brief as the home-going steamer awaited me. In permanent preparations examined later, a very few trypanosoma were observed. Later fate of the horse is unknown.

From this observation it may be gathered that animals may become infected with tse-tse not only in the hinterland of Togo, but also in the immediate neighbourhood of that strip of land in Togo that lies between the lake and the sea near by. Now as the coastal strip of Upper Guinea possesses similar climatic and geological conditions, as also the same fauna and flora, it may be reasonably conjectured that the coastal region of the whole of Upper Guinea, with its hinterland, is infected. In regard to the details as to clinical symptoms, epidemiology, &c., the reader is referred to the literature.

It is well known that, after a stage of incubation

of nine to twelve days, the disease breaks out either acutely, so that the animals perish under the appearance of rapidly increasing weakness, emaciation and anæmia, or a chronic stage sets in, in which the parasites periodically disappear from the blood, reappearing from time to time. The infected animal may then die after an illness of several months. Spontaneous cure may, according to R. Koch, set in in East Africa, but is of rare occurrence. histories of disease here set forth show that both forms occur in Togo, as also spontaneous cure (vide Case 4). As to the cure of the inoculated kid, it cannot be brought forward as a test case, as the infection was not natural. It may, however, be noted that a horse and dog inoculated by Schilling both died from this artificial infection. According to Schilling, the ædema of the scrotum, the glans penis, the extremities, and the swelling on the abdomen, may be entirely lacking in chronic cases. Case 1 of the terrier bitch shows that in the most acute cases this symptom may be absent, at least in dogs. As Schilling found parasites in the blood of the inoculated animals six days after subcutaneous inoculation, and I only confirmed parasites in the kid eight or nine days subsequently, it is possible that

in my experiments the far smaller quantity of blood

injected, 1 ccm., had something to do with this.

Whereas Schilling did not find splenic tumour, this

only interrupted by a three days' stay on the coast. During the tour the horse and his master had frequently been wet through. For eight or nine days the horse had appeared unwell, was feverish, and off its feed, and did not drink much. No alteration of the urine and stool was remarked. For a few days, a slight swelling of the hind legs had been observed, and there was a ribbon-like thickening on the abdomen.

<sup>‡</sup> Dr. Schilling in his essay mentions two kinds of ticks in Togo: a large grey tick, such as I also had found, and a smaller, flat kind, with dark brown and red drawings on the back. It is probable that the latter are a younger stage of the former. The larvæ, nymphæ, males, and young females are essentially different from the large females seen in the former kind.

<sup>§</sup> Hans Ziemann on "Blood Parasites in Temperate and Tropical Malaria," Centralbl. f. Bact. u. Paras., 1896. Nos. 18, 19. Also "Report on Malaria," &c., Deutch. med. Woch., 1900 (Reply to Dionisi).

Bruce, "Further Report on the Tse-tse Fly Disease or Nagana in Zululand." London, 1897. Robert Koch, "Travelreports on Rinderpest, &c., Tse-tse or Surra Disease, &c.," Berlin, 1898. Plimmer and Bradford, Centralbl. f. Bakt. u. Par., 1899, Part I. p. 440. Lingard, "Report on Horse Surra, Bombay," cited from Dolfein, "Protozoea." (Lingard's work is not yet published.)

symptom was undoubtedly present in Case 1. This possibly has something to do with the material used for observation. In regard to this and other small differences in observation, as, for instance, the ecchymoses, comparisons must be made with original matter (under the description of the parasites, where further differences will be noticed). The swelling of the testicles, which Schilling mentions as a sign of disease, I have not seen. I may, however, mention that in Cameroon, in 1894, while making enquiries on the diseases of animals on the West Coast of Africa, I heard of "malaria" in horses in Togo which commenced with scrotal swelling. Now this "malaria" was nothing but tse-tse disease (see H. Ziemann, Ueber Malaria u. andere Blutparisiten, 1898, p. 98). Schilling likewise observed the peculiar staggering in a sick pony, only this animal did not fall down as did the terrier mentioned, which fell down again and again as soon as it was stood up.

NAME AND ETIOLOGY.

Long before the discovery of tse-tse disease, peculiar parasites, the *Trypanosoma lewisi* (Kent), were found in rats, and they have recently been excellently described by Rabinowitsch and Kempner, Senn and v. Wasielewski. The parasites are slender, exceedingly lively flagellates, with a long anterior cilia of the same length as the cellular body itself, and possessing an undulant membrane. In preparations stained by the method to be described below, a thick, round grain of chromatin is observed in the anterior part, and a smaller one in the posterior part, conjectured to be the root of the cilia, from which the undulant membrane originates, and which in front forms the anterior process.

Propagation, according to these authors, occurs by means of longitudinal or transverse division, and by segmentation through division into numerous rosetteshaped shoots. They are mostly harmless parasites of the rats which are transmitted by fleas. These are morphologically different from the actual tse-tse parasites, as has been proved by Koch's inoculation experiments. Tse-tse disease or nagana has long been known in South and East Africa, as also a very similar disease, especially affecting horses, camels, elephants, and buffaloes in the East Indies. It is called surra, and, according to Evans, is transmitted by large flies; and is named dourine in Algiers, the south of France, and the north of Spain, where it occurs in horses and asses. These diseases are not transmitted by the tse-tse fly, but by other stinging insects. Nocard considers the three diseases to be one and the same, and Schilling is inclined to the same opinion, and therefore calls the disease in animals in Togo "surra." Doubtless the three diseases and their exciter are intimately related. In the meantime the exciters of the hæmoglobinuria of cattle in Germany are also morphologically very similar to those of Texas fever, as the author was able to prove,\* and

yet, for epidemiological reasons, it is best to divide the two diseases, as the hosts of the germ of disease are two different kinds of ticks, which transmit the Pirosoma bigeminum.

The exciter of the East Indian "surra," the Try-panosoma Evansi, is asserted to be somewhat longer than the exciter of tse-tse. The trypanosoma of "dourine" likewise exhibits diversities, as it is not transferable to ruminants, as proved by experiments on animals. Schilling, moreover, proved that the tse-tse fly, which is found in Togo also, having fed on sick animals, transmits the disease, I therefore suggest that the name "tse-tse" be used.

OBSERVATION OF THE TOGO TSE-TSE PARASITES IN THE LIVING BLOOD.

As in all blood examinations in man and beast it is usual to take the blood to be examined from a wound on the ear, the examination in the suspended drop is only to be recommended for the purpose of demonstrating the duration of life of the parasite, or the changes undergone on adding various materials. It is more advisable for this purpose to keep the blood in capillary tubes; I thus kept the trypanosoma of the kid's blood (in the refrigerator of the steamer) alive for days.

Usually the specimens are made in the same

manner as preparations of malarial blood.

One may then observe, corresponding to the case, a larger or smaller number of slender, excessively motile trypanosoma, having a flagellum at the anterior sharply-pointed end, and which is about onethird to one-fourth the length of the protoplasm. The length of the parasite varies considerably in the very motile forms, averaging 16-18-20 μ, the breadth about 2 µ. There were, however, also smaller parasites  $11\frac{1}{2}$  to 14  $\mu$  in length. The movements, as Schilling also observed, were more violent at the flaggellated end, so much so that the blood corpuscles are whipped hither and thither by the motions. The movement as a rule is serpentine; sometimes the two extremities bend towards each other and then spring apart, and then the serpentine motion is taken up again. When a great many parasites are in the preparation, as was the case in the dead terrier, where in every field of vision (Leitz, ocular 1 and immersion  $\frac{1}{12}$ ) there were at least forty to fifty trypanosoma wriggling about, it looked like a swarm of gnats, for parasites and blood corpuscles were all on the move. A study of details under such circumstances is impossible. A preparation containing fewer parasites is more suitable, especially when their movements are curtailed by the addition of certain liquids. The motility was least in the broader forms, the greatest breadth at the moment of the least motion being about 4 µ. In such forms, which were somewhat rare in my preparations, the flagellum was somewhat shorter and the posterior end was rounded off. The protoplasm itself reminded one of the appearance of Trichomonas vaginalis.

Sometimes parasites were observed in which both ends were pointed. Their motility, however, was but

slight

The bodies of the trypanosoma are not actually

<sup>\*</sup>H. Ziemann, Ueber Lomadera eine Art ausserst verbreiteten Texas fieber in Venezuela. Deutsch. Med. Wochenschr., 1902, Nos. 20 and 21. (Translation in JOURNAL OF TROPICAL MEDICINE, August 1, 1902.) Ueber das endemische Vorkommen der seuchhaften Hänniglobinuria der Rinder in Deutschland. Deutsch. Med. Wochenschr., 1901, No. 1.

hyaline but finely granulated. In fresh preparations several light refracting particles are sometimes observable in the body, a larger, mostly less sharply circumscribed spot in the anterior part, mostly on the border between the first and second quarter of the length. Quite near the posterior extremity there were besides one or two distinctly circumscribed light refractory spots measuring about  $\frac{3}{4}~\mu$ .

The process of division so graphically described by Schilling was only observed in stained preparations.

(To be continued.)

### Bebiews.

THE PRACTITIONER'S GUIDE. By J. Walter Carr, M.D. Lond., F.R.C.P.; T. Pickering Pick, F.R.C.S.; Alban H. G. Doran, F.R.C.S.; Andrew Duncan, M.D., B.S.Lond., F.R.C.S., M.R.C.P. London, New York and Bombay: Longmans, Green and Co., 1902, pp. 1,107.

The text of this eminently practical book is arranged in dictionary form, and is therefore available for ready reference. The material has been brought within the scope of a single volume, but so carefully judged, balanced and sifted is the profusion of literature to which modern medical, surgical and gynæcological knowledge has attained, that ample justice is done to every branch of the subject essential to those engaged in the practice of medicine.

Tropical medicine is ably dealt with by Andrew Duncan, M.D., Joint Lecturer on Tropical Medicine at the London School of Tropical Medicine. Dr. Duncan handles the larger subjects appertaining to tropical diseases in a masterly fashion, and with a grasp which is to be highly commended. Considering the enormous number of old tropical residents and travellers who return to this country and who come under the care of medical men in quite remote parts of the country, a concise and succinct account of the more prevalent tropical ailments is a necessity. This Dr. Duncan has successfully accomplished. To the young practitioner also, starting for the Tropics, he will find in the pages of "The Practitioner's Guide" exactly what he wants, namely, a thoroughly up-todate account of the diseases he will have to treat in the daily routine of practice. It will be observed that, unlike other works in medicine, "The Practitioner's Guide" includes the ordinary surgical operations and the diseases of women. A more useful hand-book for the practitioner has never been published.

THE SO-CALLED "SPOTTED FEVER" OF THE ROCKY MOUNTAINS. A Preliminary Report to the Montana State Board of Health. By Louis B. Wilson, M.D., Minneapolis, and Wm. M. Chowning, M.D., Minneapolis. The Journal of the American Medical Association, July 19th, 1902. "Spotted fever," "blue disease," or "black fever," are the various local names given to a peculiar disease

which has been known for about thirty years over limited portions of the States of Montana and Idaho in North America. The persistence of the disease in Montana, along the eastern foothills of the Bitter Root Mountains, led the Montana State Board of Health to undertake a special investigation as to its etiology and pathology. The investigation was entrusted to Drs. Louis B. Wilson and Wm. M. Chowning, of Minneapolis, who have carried it out most satisfactorily. Previous to their report, the only article on "spotted fever" in a medical journal was that by Dr. E. E. Maxey in the Portland Medical Sentinel, for October, 1899.

Dr. Maxey's paper describes cases in Idaho, mostly along the southern foothills of the Bloise Mountains.

In Montana, the disease is restricted to the western slope of the Bitter Root River valley. This valley is about 3,500 feet above sea-level, it has a mild climate, and is populated by fairly well-to-do ranchers from Missouri, Georgia, and the Carolinas.

Spotted fever is, as a rule, a very grave disease, with a high death-rate of 70 to 80 per cent. It attacks any age and either sex. It is definitely limited in its geographical distribution. In the State of Montana, while prevalent along the eastern slopes of the Bitter Root Mountains, it is sharply cut off from the eastern side of the valley by the Bitter Root River.

It is confined entirely to one season of the year, namely, spring. The earliest recorded case began on March 17th, and the latest about July 20th, but most cases occur between May 15th and June 15th.

According to Dr. Maxey, the disease appears to be more malignant in some localities than it is in others, and in one year more than in another. The disease is not contagious.

Symptoms.

The symptoms of spotted fever are characteristic of specific infection. Most cases are preceded by a short period of malaise, then follows a well-marked chill recurring at irregular intervals, though with decreasing severity, throughout the attack. At the onset, there is a severe aching in the bones and muscles with pains in the back and joints. The patient is usually very weak, but restless and headache may be severe. The skin is dry and the tongue is thickly coated. The coat at first white becomes brownish as the fever increases, while the tongue becomes dry and cracked. Indeed, the whole facies in these respects is very like typhoid.

After the initial chill, the temperature may reach 103° to 104° F. on the second day. It gradually increases and reaches its maximum in from five to seven days, when it may register from 105° to 107° F. Usually a slight evening increase and morning decrease is noted. Where recovery occurs it usually is by lysis, much as in typhoid. The diminution of the fever begins about the end of the second week and reaches normal about two weeks later.

A characteristic eruption appears on the skin from the second to the fifth day after the chill, it begins about the wrists and ankles, or on the back. It then extends over the entire body, covering the scalp, the palms of the hands and the soles of the feet. The abdomen usually is the last surface involved. As a rule, the eruption reaches its maximum in about two days, but sometimes it spreads very rapidly. At first it consists of circular rose-coloured spots varying in size from one to five millemetres in diameter. These macules are not elevated; they disappear on pressure, but quickly reappear. They are sometimes tender to the touch; very soon they assume a dark blue or purplish colour, they increase in size and do not disappear on pressure. The confluence of the extending macules often gives a mottled or marbled appearance to the skin, especially in the dependent portions, but in some cases the eruption at no time becomes confluent, and only small brownish or purplish petechiæ may be present, giving a speckled appearance, which has been likened to that of a turkey's egg. The skin is not only covered with spots, but is also somewhat jaundiced; this may be quite marked in the conjunctivæ. About the third week desquamation begins. The spots fade as the fever subsides, but may not entirely disappear for weeks or months after convalescence is established. In some cases the skin may become gangrenous on the elbows, fingers, toes, lobes of the ears, &c. Constipation is usually present from the beginning. About the beginning of the second week nausea and vomiting develop and continue in fatal cases to the end. The liver is somewhat enlarged. The spleen is uniformly enlarged and tender on palpation. The urine is usually reduced in amount and highly coloured. A small amount of albumin, and both granular and blood casts were found in all cases examined. In all severe cases, more or less ædema of the face and extremities is present. The ædema may be marked and may appear as early as the third day of the disease. A low, muttering delirium as in typhoid fever is present in severe cases, the patient being but partly rational. The respiration rate is frequently out of all proportion to the temperature; sometimes it reaches 60° per minute in the adult, though ordinarily it does not run above 36° per minute. The pulse at the onset is usually full and strong, but gradually becomes more and more rapid, while it loses in volume and strength. In fatal cases in adults, it may reach 150° per minute some days before death. The red blood count in five cases examined was 4,100,000, 4,200,000, 4,300,000, 4,500,000, 4,600,000 respectively. There was a slight increase of leucocytes, from 12,000 to 13,000, in the four cases examined. Blood, when removed for examination, appears to be somewhat darker than normal, as well as somewhat less fluid. In five cases examined during various stages of the disease the hæmoglobin was 50 to 60 per cent. Freshly-drawn blood, when examined with the 1—12 oil immersion objective shows peculiar hæmocytozoa sparingly in the erythrocytes.

### Morbid Anatomy.

Six autopsies were made. The following lesions were found: The skin was covered with a petechial rash, and in all cases presented small wounds due to tick bites. The lungs showed hypostatic congestion. The epicardium usually contained a few petechial hæmorrhages near the base of the left ventricle. The myocardium was softened. The right ventricle was filled with dark fluid blood; the left was almost empty or contained only a small clot. The spleen was enlarged, being from three to three and a half

times its normal weight. The capsule was distended and thinned. On section the tissue was found dark red and so soft as to be in most cases diffluent. The stroma was not increased in amount, but it was engorged with blood cells and leucocytes. The omentum covering the spleen was usually congested. The liver was slightly enlarged, pale in colour and of normal consistence. Microscopically it showed pronounced fatty degeneration. In all cases one or both kidneys showed small sub-capsular hæmorrhages on the ventral surface. The capsule stripped readily. The cortex on section was congested. The meninges of the brain and spinal cord showed a slight congestion, apparently hypostatic.

Drs. Wilson and Chowning found in the blood of patients suffering from spotted fever an unpigmented hæmocytozoal parasite, probably belonging to the genus Piroplasma, and resembling very much the microorganism of Texas fever, but it is larger, and in its larger forms exhibits active amæboid movements. In the peripheral circulation, probably not more than one erythrocyte in five hundred is usually infected, but in the congested capillaries in the tissues removed at autopsy from 1 to 5 per cent. of the erythrocytes contain parasites. The majority of infected cells are in the lung, spleen, liver and kidney. In these organs many infected erythrocytes are included in phagocytes.

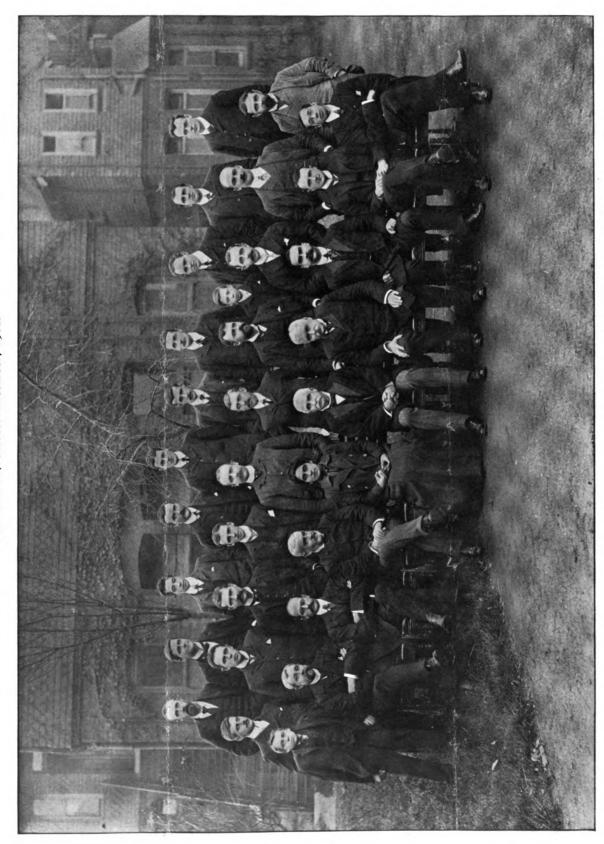
The organism of spotted fever varies greatly in size, form and staining reaction at various stages of its development. The smallest forms (phase 1) when seen in fresh (unstained) preparations, are intracellular, ovoidal bodies, about one micron in thickness, and one and a half to two microns in length. A few, but certainly not nearly all, of these bodies are stained by Loeffler's methylene blue. When so stained the smaller extremity takes up more of the stain than does the larger extremity, which remains but faintly blue even after prolonged staining. Perhaps one in ten of the red cells which are infected with this form of organism contains two instead of one of the bodies. When the organisms are in pairs within a cell, their long axes usually lie in the same straight line, though they may be placed at an angle as acute as sixty degrees. Their lesser extremities are often toward each other, though distinctly separated by a small interval. These bodies show no evidence of amœboid movement, but they have occasionally been seen to change their position within the erythrocyte.

Several gradations of size, in both single and paired organisms, have occasionally been observed up to phase 2. This phase is marked by an organism solitary within the red cell, and usually ovoidal in form, though it may be elongated, ellipsoidal or spheroidal. It is from two to three microns thick and three to five microns long. This type in freshly-drawn blood frequently exhibits active amæboid movements. The movements consist in the elongation of the organism, the projection and retraction of pseudopodia, and the assumption of the ovoidal form. The ovoidal form, however, appears to be lost shortly after death, since although many of this form were present in the tissues from an autopsy made three hours after death, but very few were present in the tissues from other autopsies made seven and eight hours after death.

# Bale & Danielsson, Ltd., London.

# STUDENTS AND SOME OF THE STAFF OF THE LONDON SCHOOL OF TROPICAL MEDICINE.

10th Session, October-December, 1902.



A. H. Davies, A. Balfour, M. C. Blair, W. S. Milne, J. T. Hancock, C. J. Baker, T. Hood, Charles (Lab. Boy), W. J. J. Stewart, E. Langley Hunt, C. W. Daniels (Med. Superintendent), Robert (2nd Lab. Assistant), D. Christie, R. A. Bellilos, O. Galgey, Miss E. da Cunha, Sir Francis Lovell (Dean), Dr. P. Manson (Lecturer), Dr. L. W. Sambon (Lecturer), G. Hungerford, R. F. De Boissière. R. T. Herdman, S. P. Peart, G. Lecesne, M. E. O'Dea, J. Lunn, D. Steel, W. Fletcher, G. Duncan Whyte, G. B. Warren (Lab. Assistant), M. Sandeman,

Capt. J. Entrican, H. E. C. Corkery, Shaik Dawood, S. M. J. Halligan, W. W. Claridge. The following Students are not in the Photograph:-

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In these tissues the organisms were almost all spheroidal. In the tissues removed at autopsy the parasites are metachromatic to methylene blue.

In the freshly-drawn blood are sometimes found bodies measuring about 0.5 to 1 micron in diameter and exhibiting active Brownian movement. Possibly they represent phase 3. They are found occasionally in pairs, and these resembling diplococci. They vary much more in size than do cocci of one species, and sometimes, also, are ovoidal in shape. They stain but faintly with Loeffler's methylene blue, and indeed in all respects resemble the smallest intracellular forms except that they are smaller, extracellular, less numerous and more diplococcus-like. In direct cover-slip preparations made from the blood at autopsy no extracellular forms have as yet been found.

Drs. Wilson and Chowning made some inoculation experiments and obtained positive results in two rabbits. These rabbits, on the day following inoculation, showed a rise of temperature of 1° C. At this time intracellular organisms were found in the blood of both rabbits, and continued present in specimens

collected on successive days for two weeks.

Drs. Wilson and Chowning believe that the parasite of spotted fever is probably conveyed to man by ticks. They base this opinion not only on the analogy of the closely allied Piroplasma bigeminum which is transmitted by the cattle tick, Ripicephalus annulatus, but on the very suggestive fact that all the patients (eleven) which came under observation during their investigations had been bitten by ticks. In three cases a history was given of a single severe tick bite two, three and five days respectively, before the onset of the disease. Besides, there is no evidence whatsoever to prove that spotted fever can be transferred in a direct manner from man to man; likewise, there is no evidence to prove that it may be transmitted by the means of water or food. The occurrence of the disease in isolated cases in a region sharply limited on one side by a river, would indicate the conveyance of the germ to man (if by any animal whatsoever) by a temporarily parasitic animal which travels slowly and not widely, and which is not carried far by the wind, &c. The tick answers this description. Moreover, the seasonal limitation of spotted fever coincides most admirably with the period of the year in which ticks are active.

The extreme isolation of cases of spotted fever, their occasional development in localities removed many miles from the site of any previous case, and the long period existing between the death or convalescence of the last case of any one year before the development of the first case in the following year, would point to the possibility of the red blood cells of some of the lower warm-blooded animals being the normal habitat of the parasitic protozoon in that stage of its lifecycle not passed within the body of some arthropod. Of the animals within the infected region the common gray gopher would, according to Drs. Wilson and Chowning, best fulfil the conditions of such a parasitism

Drs. Wilson and Chowning are now attempting to obtain data which shall confirm or demolish the above

hypothesis.

DIE MALARIA DER AFRIKANISCHEN NEGERBEVOL-KERUNG BESONDERS MIT BEZUG AUF DIE IMMUNI-TATSFRAGE (The Malaria of the African Negro Population, more especially in Relation to the Question of Immunity). By Dr. Albert Plehn. Jena: Gustav Fisher, 1902.

This interesting work exhibits the scientific accuracy and close study with which we are familiar in the writings of this author, and his statements are supported by practical observations. Dr. Plehn states that in both the children and adults of the negro population malarial parasites are present in the blood, independently of their state of health. In nearly all negro infants, even of the tenderest age, numerous malarial parasites are found in the blood without detriment to the health and without causing fever; on the other hand, however, attacks of fever sometimes supervene without demonstration of malarial parasites in the peripheral blood. According to Plehn's opinion the strict division of

According to Plehn's opinion the strict division of the various parasites into three or four definite forms is untenable, as according to the particular condition under which it develops the parasite is capable of assuming various forms, or, indeed, may pass from one form to another, determined by the divergent development of the vacuole, nucleus and

plasma.

These observations are demonstrated by a series of excellent coloured plates illustrating numerous observations on the forms of the parasites of quartan,

tertian and irregular fevers.

Plehn considers Koch's theory on the extermination of malaria by destroying the malarial parasites in man as untenable, as a quinine prophylaxis is founded on the parasitic condition of the blood in inhabitants of the tropics, and fever sometimes exists without the demonstration of parasites in the peripheral blood and vice versa; there is also the possibility of infection of the mosquitoes to be taken into account.

# Hews and Notes.

MR. HENRY S. WELLCOME has issued invitations for a dinner to be given to Dr. Andrew Balfour, of Edinburgh, previous to his departure for Khartoum, where he is to take up his duties as Director of the Clinical and Bacteriological Research Laboratories in the Gordon's Residential College. Dr. Balfour leaves for Egypt on December 11th.

THE Copley medal of the Royal Society has been awarded to Lord Lister "in recognition of the value of his physiological and pathological researches in regard to their influence on the modern practice of surgery."

It is announced that Professor R. Koch intends visiting South Africa for the purpose of investigating the widespread disease amongst cattle prevalent there.

THE SLEEPING SICKNESS COMMISSION IN UGANDA.

Dr. Low, Craggs Research Scholar, London School of Tropical Medicine, is on his way home from Uganda. It will be remembered that Dr. Low, in conjunction with Dr. Castellani and Dr. Christy, was sent out some months ago by the Royal Society and Foreign Office to investigate sleeping sickness in Uganda. Although Dr. Low has finished his work in connection with the pathology of the disease, Dr. Castellani and Dr. Christy are remaining behind for a time, the former to continue his bacteriological work, whilst Dr. Christy is to visit other districts, and intends returning to England after traversing the region of the Upper Nile. No official report is as yet to hand, but a statement has been circulated in the press that the members of the Commission hold that the disease is bacterial in its nature and not of filarial origin, as was at one time suspected.

A LEPROSY ENQUIRY.

Mr. Jonathan Hutchinson, F.R.S., starts for India on December 22nd, in the hope of being able to remove, by enquiries on the spot, certain objections to his hypothesis that the consumption of badly cured fish is the cause of leprosy. His itinerary is to be Ceylon, Madras, Calcutta, Assam, and finally Northern India.

Whether Mr. Hutchinson's theory of the origin of leprosy is believed or not, we are sure that so astute an observer will add considerably to our knowledge of the distribution of the disease. His theory regarding the etiology of leprosy and his opinion in regard to the futility of complete segregation as a means of eradicating leprosy are so well known, that we expect Mr. Hutchinson will devote his attention almost solely to these two arguments. Whilst regretting this in the main, we can only see that good can come of the enquiry, for as yet, Mr. Hutchinson's is the only working hypothesis advanced concerning the etiology of leprosy, apart from its bacterial nature, that we have before us. We wish Mr. Hutchinson a safe and scientifically successful voyage.

COLONIAL TRAINING FOR WOMEN.

The Horticultural College at Swanley, Kent, is about to commence a course for the training of women for colonial life. The course will occupy about a year, and special attention will by paid to horticulture, dairy work, and out door occupations. In addition to these subjects the syllabus of instruction includes seed sowing, fruit packing, jam making, fruit bottling, cow keeping, carpentering, household management, colonial hygiene, and native languages.

SIR WILLIAM MACGREGOR, K.C.M.G., GOVERNOR OF LAGOS, IN LIVERPOOL.

At Liverpool, on November 17th, the African Trade Section of the Liverpool Chamber of Commerce entertained H.E. Sir William Macgregor, at dinner. Sir A. Jones, K.C.M.G., occupied the chair, and whilst proposing the health of "the Governor of Lagos," stated that a great improvement had been made in the sanitary condition of West Africa, that Liverpool had contributed largely towards that desirable end, and that Liverpool had started the Tropical School and set the world on fire. A deep debt of gratitude was due to Sir

William MacGregor for what he was doing in West In the course of his reply, Sir William Macgregor said that in trying to improve sanitation in Lagos efforts should not be confined to benefit persons of one race or colour, but that natives and Europeans should be considered together, and he had steadily and consistently been opposed to the idea of separating Europeans from the natives, in order that the former should not contract malaria from the natives. He firmly believed that the extermination of malaria could only be looked for by carrying Europeans and natives forward in one line. Lagos had become the outlet of the vast area of Northern Nigeria, and could malaria be reduced a great future was in store for the colony. Mr. John Holt, in his speech, said that Major Ross would live in Liverpool annals, and in the annals of the nation, as one of the benefactors of the human

FUNDS FOR THE LIVERPOOL SCHOOL OF TROPICAL MEDICINE.

The Lord Mayor of Liverpool proposed the toast of the Liverpool School of Tropical Medicine at the dinner to Sir William MacGregor, on November 17th. Mr. W. Adamson, Vice-Chairman of the School, in replying, said that Professor Boyce, by his exertions, enabled him to announce the fact that a chair in the University College had not only been founded but endowed by special contributions amounting to over £10,000; of this total Sir Alfred Jones had contributed £5,000, and the Hon. R. B. Blaize, of Lagos, £500. He hoped the chair would be called the Sir Alfred Jones Chair of Tropical Medicine and Parasitology, and that Major Ross would be elected as the first professor.

Sir Alfred Jones stated that he had received a telegram from Mr. Chamberlain congratulating Liverpool on the great success of the School, and also announced he had received another message from the King of the Belgians, in which His Majesty states he was willing to contribute £500 towards the expenses of sending representatives of the Liverpool School of Tropical Medicine to the Congo.

# Current Miterature.

A NEW THEORY OF THE WAY QUININE ACTS.—Dr. A. F. A. King, U.S.A., suggests that the curative effect of quinine may be due to fluorescence producing violet rays of light in the blood. His opinion is based on the supposition that the malarial parasite will not sporulate in the dark; that the light it has in the blood is red; and since it has been demonstrated that amœba proteus streams in the presence of red light and ceases to stream in violet light, it has been assumed that the same may be true of the malarial amœba.—Amer. Journ. Med. Šc., June,

UNDUE EFFECTS OF QUININE ADMINISTRATION.-M. A. Martinet draws attention not only to the aural disorders attributed to quinine, but states that in old people the drug is apt to cause irritability of the

of-

bladder. He is not of opinion that quinine causes uterine contractions; it may, however, induce vomiting, cutaneous eruptions, and in poisonous doses cause convulsions, loss of consciousness, collapse, cyanosis, and suppression of the urine. Dr. Martinet, however, states that these deleterious effects may be combated by aperients, diuretics and stimulants.—Presse Médical, April 19th, 1902.

Contribution to the Anopheles Fauna of West Africa.—Dr. Hans Ziemann had the opportunity of collecting and examining numerous mosquitoes in Duala, Victoria, near the Cameroon mountains, in Togo and suburbs, and in Monrovia. The specimens were forwarded to Germany for identification by Dr. Enderlein.

The author observed that the Anopheles everywhere were infinitely more numerous during the rainy season than in the dry season.

A new Culex (not yet classified) was found on the Cameroons at an altitude of 1,600 metres, but no Anopheles were found in Buëa (the health resort of Cameroon), at an altitude of 900 metres. They were numerous in the Molive plantation, 220 metres above the level of the sea, but were scarce in the Boana plantation, 260 metres above sea-level.

It is a curious fact that the *Anopheles* in Victoria suck blood only a few hours after they have emerged from the pupa; but in Togo they could only be made to bite twenty-four or even forty-eight hours after.

The following varieties are found:-

Anopheles costalis, Loew. Frequent in Cameroon, particularly during the rainy season, on the upper reaches of the Wuri River, in Victoria, in Togo, Monrovia, and Upper Guinea.

Anopheles funestus, Giles. In Victoria, frequent in the huts of the natives during the rainy season.

Anopheles Pharoensis, Theobald. Frequent on the upper reaches of the Wuri River near Duala, in September in Victoria, and in Lome and Togo in

Upper Guinea.

Anopheles Ziemanni. A new species, described by Grünberg (Zoolog. Anzeiger, July 21st, 1902), in large numbers on the Wuri River, but were never observed

in Duala or in the neighbourhood.

A. costalis, funestus, Ziemanni. All these varieties transmit malaria.—Archiv für Schiffs- und Tropen Hygiene, October, 1902.

TREATMENT OF TARANTULA BITE.—Dr. J. S. Boyers reports the case of a healthy man, aged 52, who was bitten on the forefinger by a gravid female tarantula five inches in length. Dr. Boyers arrested the circulation of blood in the finger with a narrow bandage. He then made a crucial incision to the bone over the site of infection and held the finger under the tap, exposing it thoroughly in the running water for about one minute, and applied a saturated solution of potassium permanganate, working it thoroughly into the wound. The symptoms were as follows: Complexion of an ashen hue. The extremities cold and bathed in perspiration. The pupils slightly dilated. Hearing considerably impaired. The constitutional treatment consisted first of  $\frac{1}{30}$  grain of strychnine with  $\frac{1}{100}$ grain of nitroglycerin hypodermically, and during the first hour and a half after the bite he was given in

all, by mouth and hypodermically, in small doses frequently repeated,  $\frac{1}{15}$  grain of strychnine,  $\frac{1}{33}$  grain of nitroglycerin,  $\frac{1}{38}$  grain of atropine,  $\frac{1}{8}$  grain of morphine, 1 oz. of aromatic spirits of ammonia, and 6 oz. of good brandy, besides using artificial heat. The bowels, kidneys, and skin were kept active. The patient recovered in four or five days. —Fort. Wayne Med. Journ., September, 1902.

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### MALARIA.

EPILEPSY IN PERSONS SUFFERING FROM MALARIA. --The relation of malaria to epileptic seizures has recently been dealt with by Dr. Corsini. The author distinguishes between the attacks of epilepsy occurring during an attack of actual malaria fever and those which develops in persons who are merely the subjects of malaria. Corsini relates the case of a patient in whom, during the period of chill, epileptic convulsions almost invariably supervened. The paroxysm ran its natural course of chill, high temperature, and perspiration. The relationship of the epileptic seizure to the onset of the chill is difficult to gauge; that it is due to cerebral irritation caused by an accumulation of malarial parasites in the blood-vessels of the brain would appear untenable, seeing that it is only in æstivo-autumnal fever that such a condition exists. The mere mention, however, of the connection of epilepsy with malarial fever is an interesting feature, and may aid us in elucidating the etiology of epilepsy. -Gazetta degli ospedali e delle cliniche, August 3rd, 1902.

THE MOST RATIONAL PERIOD TO ADMINISTER QUININE IN MALARIAL FEVER.-Dr. I. A. McSwain says that as the spores of the malarial parasite escape into the blood at the end of the stage of chill and rigor, quinine ought to be administered at that time, as thereby the newly-formed spores are exposed to the influence of the drug before they can re-enter the fresh red corpuscles of the blood.—Southern Practitioner, August.

### PLAGUE.

THE PLAGUE, ITS "DIFFUSIVE TENDENCY"; HAFF-KINE'S ANTI-PLAGUE VIRUS v. YERSIN'S SERUM.—Dr. T. D. Burch draws attention to Calmette's statement that persons treated, during the incubation period of plague, by Haffkine's serum would suffer from the disease when it developed in an aggravated form. Major Bannerman, I.M.S., in his reports states, however, that Haffkine maintains that inoculation with his vaccine is harmless in the incubation period of the disease, and can be safely employed for persons who have been in contact with those suffering from plague. Calmette advocates the use of Yersin's serum both before and after exposure to plague. Experience in India, however, refutes Calmette's contention, and the opinion at the present moment is greatly in favour of Haffkine's serum in preference to any other .- New York Med. Journ., September 20th, 1902.

THE PRODUCTION OF IMMUNITY IN PLAGUE BY ANTI-PLAGUE VACCINE ADMINISTERED BY THE MOUTH .-Mercatelli Vincenzo, by way of dealing with the introduction of an anti-plague vaccine into the system by some other method than by subcutaneous injection, has been experimenting on guinea-pigs by administering a bolus of anti-plague vaccine by the mouth. He found that large doses caused gastro-enteritis, which sometimes proved fatal. Vincenzo found that one dose contributed a slight degree of immunity to plague in the animal experimented upon, and he is of opinion that with repeated progressive doses a further immunity might be obtained. Unfortunately, the author does not mention the dose of the vaccine; but in view of the refusal of many persons, native and European alike, to vaccination or subcutaneous injection, it is to be hoped Vincenzo will continue his experiments.-La Riforma Medica, August 5th, 1902.

### EXCHANGES.

Annali di Medicina Navale.

Archiv für Schiffs u. Tropen Hygiene.

Archives de Medicine Navale.

Archives Russes de Pathologie, de Médec. Clinique et de

Bacteriologie.

Australasian Medical Gazette.

Boletin de Medicina Naval. Boston Medical and Surgical Journal.

Bristol Medico-Chirurgical Journal.

British and Colonial Druggist.

British Journal of Dermatology.

British Medical Journal.

Brooklyn Medical Journal.

Caducée.

Climate.

Clinical Journal.

Clinical Review.

Giornale Medico del R. Esercito.

Hong Kong Telegraph.

Il Policlinico.

Indian Engineering.

Indian Medical Gazette. Indian Medical Record.

Janus.

Journal of Balneology and Climatology.

Journal of Laryngology and Otology. Journal of the American Medical Association.

La Grèce Médicale.

Lancet.

Liverpool Medico-Chirurgical Journal.

Medical Brief.

Medical Missionary Journal.

Medical Record.

Medical Review. Merck's Archives

New York Medical Journal.

New York Post-Graduate.

Pacific Medical Journal.

Polyclinic.

Public Health.

Revista de Medicina Tropical.

Revista Medica de S. Paulo.

Sei-i-Kwai Medical Journal.

The Hospital.

The Northumberland and Durham Medical Journal.

Treatment.

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3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the

5.—Correspondents should look for replies under the heading "Answers to Correspondents.

# The Journal of Tropical Medicine.

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### Original Communications.

A REPORT OF FOUR CASES OF MALARIA AT THE BRANCH SEAMEN'S HOSPITAL, ROYAL ALBERT DOCK, TREATED BY ARRHENAL.

Under the care of Dr. Patrick Manson, C.M.G., F.R.S., with a Commentary by C. W. Daniels, M.B., M.R.C.S.
Reported by W. G. Ross, M.D., M.R.C.S.

The immediate effects of quinine are uniformly markedly beneficial in cases of malaria. The action as regards the attack is rapid and certain, but unfortunately, unless the treatment is continued for a protracted period, recurrences are frequent. Any drug, therefore, that has as good an immediate effect and also prevents relapses and recurrences, would be most valuable. Dr. Armand Gautier, of Paris (Archives de parasitologie), claimed these properties for a new cacodylate called arrhènal and gave illustrative cases treated by this drug. Four cases of malaria have been treated at the Branch Seamen's Hospital by this method. A brief history of each case and temperature chart is appended.

CASE I.—W. R., aged 33, clerk. Last from Hong Kong. Admitted June 14th, 1902. Had malaria in Hong Kong for the first time on March 2nd, 1901; a severe attack; was in hospital three weeks; had several relapses and was invalided home on November 10th, 1901. Did not have any recurrence after that date until an attack on May 27th, 1902, which lasted

until his admission on June 14th.

An examination of his blood showed a small quartan and a moderate double tertian infection. He had a daily rigor and temperature of over 106°. When the character of his infection had been ascertained, 9 grains of the bi-hydrochlorate of quinine were injected into the gluteus maximus daily for three days; his temperature fell to normal, and he was put upon 5 grains of the sulphate of quinine three times daily.

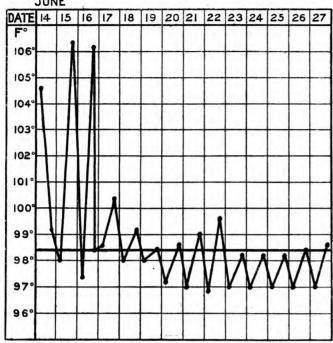
This he continued to take from June 19th until September 7th, when he stopped taking it. On the 9th he caught a cold travelling in a night train. He applied again for admission on September 15th, when his temperature was 103.8°. On the 16th there was no fever; on the 17th he had a rigor and a temperature of 106.2°. An examination of his blood showed a large infection of benign tertian parasites. This seemed a very suitable case for the use of arrhenal. On September 18th, 19th, and 20th, 5 centigrammes were injected intramuscularly, and on the 21st, 10 centigrammes. On the 22nd there was no fever, but the number of the parasites was such that fever was sure to occur. The patient was decidedly ill, and at 9.30 p.m. on that day an intramuscular injection of quinine was given. On the 23rd there was no rigor, but the temperature rose to 105.4°. On the 24th the temperature had become normal and the parasites were very few in number. An injection of quinine was given on the 22nd, 23rd, and 24th, and quinine was continued by the mouth during the rest of the patient's stay in the hospital. There were no parasites found in his blood on the 29th, and the patient was discharged on October 6th, there being no rise in temperature and no parasites in the blood; he was instructed to take quinine for three months.

Remarks.—This was a case in which the febrile attacks were known to yield readily to quinine, but in which even the prolonged use of quinine did not prevent recurrence of the disease. As the temperature chart and blood examinations show, arrhenal had no beneficial effect at all, whilst quinine had a

rapid action.

Case II.—C. B., aged 36, seaman. Last voyage from Delagoa Bay. Admitted September 22nd, 1902. Acquired malaria at Delagoa Bay in May, 1902. Had repeated relapses and was irregularly treated by quinine and phenacetin. Blood examination on admission showed benign tertian parasites, a moderate infection; spleen and liver very much enlarged. On the 23rd had a severe rigor and a temperature of

105.2°. On the 25th the temperature rose to  $102\cdot 4^{\circ}$  without rigor, and he was found to have two infections of benign tertian parasites. From the 26th to the 28th there was little or no fever and the parasites



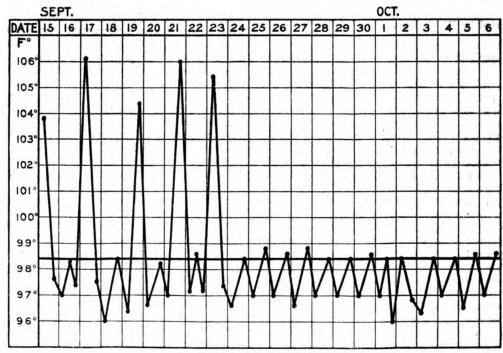
CASE I.

and a temperature of  $104.8^{\circ}$ . On October 1st, 5 centigrammes of the arrhènal were injected intramuscularly, and continued to be given in this way daily until the 3rd. On the 4th, 10 centimetres were given. The chart temperature showed an irregular rise, usually twice a day, to  $105.2^{\circ}$  and  $105.6^{\circ}$ . On the evening of the 4th the patient vomited and passed blood per rectum. It was decided to inject quinine at 2 a.m. on the morning of the 5th. At 11 a.m. on the same day the injection was repeated, when the temperature became normal. Five grains of quinine were given by the mouth three times a day afterwards. There were no parasites in his blood on the 6th.

Remarks.—Here we have a case in which warmth and rest in bed had a decided effect for a time, but arrhenal failed whilst quinine was effective.

The cases quoted by Dr. Gautier were of the socalled malignant tertian form of malaria. The failures in benign tertian were not conclusive. Two cases of malignant tertian were therefore treated as recommended by Dr. Gautier.

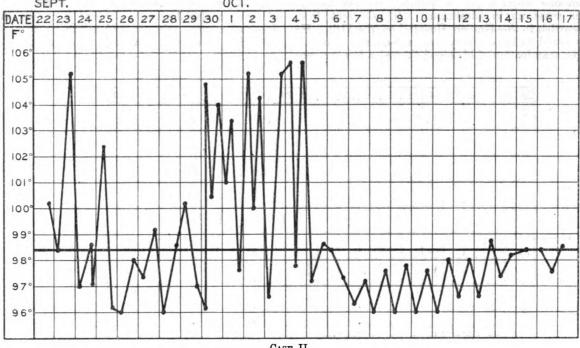
Case III.—J. C., aged 33, seaman. Last voyage from Cuba. Admitted September 27th, 1902. Acquired malaria in Cuba in July, 1902. Had repeated attacks on board ship and was given quinine irregularly by the captain. Arrived home September 21st, and has had fever daily ever since. His temperature on the 27th was 104.4°, and a blood examination showed young forms of the malignant parasite. Crescents in addition to ring forms were found on October 1st. He had a daily temperature above 103° until October 2nd, when the arrhenal injections were



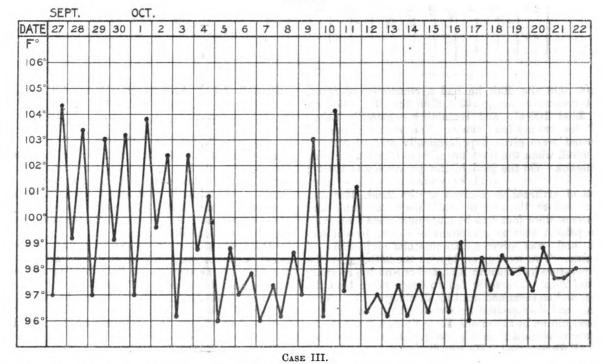
CASE I. ON RE-ADMISSION.

diminished in number. On the 29th the parasites were more numerous and continued to be found in large numbers till October 5th, when quinine was administered. On the 30th he had a slight rigor

begun. Ten centigrammes were injected hypodermically every night up to the 8th, making seven hypodermic injections. There was a reduction of temperature after the third injection, which lasted until the 9th, when the patient had a rigor and his temperature rose to 103°. On the 10th he had a rigor and his temperature rose to 104.2°. Ring forms were found to be very numerous. Some crescents commenced, crescents had been found and were increasing in number each day. Such an increase is the usual accompaniment of natural recovery from an attack and therefore the cessation of the pyrexia



CASE II.



were also found. It was decided to give him injections of quinine; three were administered on the 10th and 11th; the temperature fell to normal on the 12th and so remained until his discharge.

Remarks .- In this case, when the arrhenal was

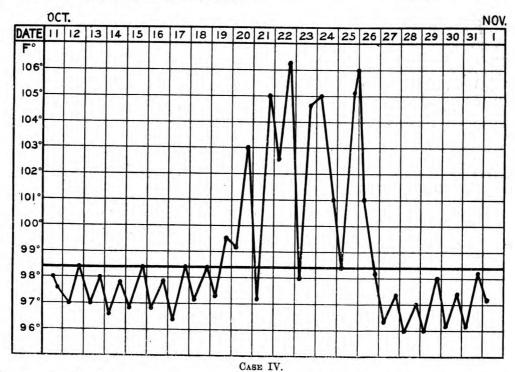
cannot be attributed with certainty to the arrhenal. Though the arrhenal was continued in full doses and for a period of seven days, a severe relapse occurred, which yielded at once to quinine.

CASE IV .- H. J. S., seaman, aged 40. Last voyage

from Mobile, Alabama, U.S.A. Admitted October 11th, 1902. Has had three attacks of malaria, the first being on September 16th. He was admitted to the Seamen's Hospital, Greenwich, on the 9th, and was given one 10-grain pill of quinine; he has had no fever since up to admission. He was sent from Greenwich to the Branch Hospital on the 11th. He was found to have a very large spleen, and a microscopic examination of his blood showed a few crescent

arrhènal were the largest dose recommended by Dr. Gautier, and twice the dose he used in most of his cases. Under quinine both pyrexia and parasites rapidly disappeared.

These cases we consider show that in the treatment of severe malarial attacks arrhenal is useless, that it does not prevent relapses, and can in no way be considered as an efficient substitute for quinine.



s. On the 20th he had a recurrence of fever, emperature being 103·2°; on the 21st 105°; on 22nd 106·4°; and remaining constantly above for twenty-four hours. Ten centigrammes of enal were given hypodermically at 1.40 p.m. on Professor of Medicine, Cairo.

Readers of this Journal will remember that on October 1st, 1901, I had an opportunity of bringing before English readers Dr. Looss's remarkable discovery, made in 1898, that ankylostoma larvæ could enter the human body by the skin as well as by the alimentary canal; and at the Cheltenham meeting of the British Medical Association in 1901, I was able, by Dr. Looss's courtesy, to show some of his sections under a microscope, proving that the larvæ entered the skin principally by the hair follicles and forced themselves into the subcutaneous tissue.

Since then, Dr. Bentley's paper, in the British Medical Journal of January 25th, 1902, has brought independent witness to bear that ankylostoma larvæ in Assam can enter the skin.

Dr. Looss, by three experiments, has now been able to prove the truth of his conviction that ankylostoma larvæ entering a healthy animal by the skin can work their way into the intestine. A puppy had his back gently smeared with a mixture of charcoal and fæces in which ankylostoma larvæ had been bred. Between nine and ten days afterwards the puppy died, and

forms. On the 20th he had a recurrence of fever, his temperature being 103.2°; on the 21st 105°; on the 22nd 106.4°; and remaining constantly above 103° for twenty-four hours. Ten centigrammes of arrhènal were given hypodermically at 1.40 p.m. on the 22nd, when the fever forms were found to be very numerous. On the 23rd his temperature was 104.4°; fever forms and crescents very numerous. The injections of arrhenal were given on the 22nd, 23rd and 24th, and at the end of that time fever forms and crescents were found to be more numerous than ever. The patient showed symptoms of cerebral complication and was given intramuscular injections of quinine. Two were given him on the 25th, when the temperature had risen to 106°, and one on the morning of the 26th. The fever fell to below normal on the 26th, and so remained until his discharge. The fever forms had disappeared on October 27th, and he was given quinine by the mouth three times a day. A few crescents remained in his blood. On the 31st they had all disappeared. He was discharged convalescent on November 1st.

Remarks.—Another case yielding readily to quinine, but with a strong tendency to recurrence. No beneficial effects followed treatment with arrhenal. The pyrexia continued uninfluenced by the drug and parasites remained numerous. The injections of

was found to have anæmia of most of his organs, and plentiful young ankylostoma worms were found in his jejunum. A second puppy was treated in a similar way, and also died on the night between the ninth and tenth days, and showed exactly the same results post mortem.

A man who offered himself for experiment was also similarly treated on his forearm, and in his case the first ankylostomum eggs were discovered in his fæces on the seventy-first day, and since then many other

eggs have been found in his fæces.

In all three experiments, the fæces of the puppies and the man were regularly examined for some weeks prior to the experiment, in order to be quite certain that they were not already harbouring the ankylostomum worm. Moreover, the worms found in the puppies were all immature, and not one single adult worm was found in their intestines, showing that the infection must have been a very recent one. In Dr. Looss's previous experiments he has found that dogs infested by the mouth also died between the ninth and tenth days, and the ankylostoma worms found in the intestine were in exactly the same stage of development as in the cases now recorded, where the animals were infested by the skin.

Dr. Looss will read a detailed paper upon his experiments at the Medical Congress in Cairo, but has kindly allowed me to send this preliminary notice to

readers of this Journal.

# REMARKS ON THE INDIVIDUALITY OF "FILARIA DIURNA."

By Louis W. Sambon, M.D. (Naples).

Lecturer at the London School of Tropical Medicine.

In the second part of the Report of the Malaria Expedition to Nigeria of the Liverpool School of Tropical Medicine, which is devoted to a compilation of recent knowledge concerning filariasis, Drs. H. E. Annett, J. Everett Dutton and J. H. Elliott suggest the identity of the embryonic filariæ which Manson has called respectively F. nocturna¹ and F. diurna. Indeed, these gentlemen declare that although many points remain to be cleared up before the question can be settled, yet "the weight of evidence is on the side of the identity of F. nocturna and F. diurna."

Drs. Annett, Dutton and Elliott base their opinion on the following data, which I quote, as far as possible,

in their own words:-

Geographical Distribution—The distribution of F. nocturna corresponds, in certain regions, with that of F. diurna, but, as far as is at present known, though there appear to be many lands where F. nocturna alone is found, in no district has it been shown that F. diurna prevails alone.

Microscopical Appearances of Embryos.—" We were unable to distinguish the embryos in the blood of natives infected with F. nocturna and F. diurna

respectively, by any means whatever."

Numbers of Embryos in Peripheral Blood.—"Here, again, there is a close similarity between the two worms."

Analogy with Avian Filariasis.—" Each species (Avian filariæ) possesses distinct adults, which give rise to a characteristic embryo. This would suggest a similar condition among human filariæ, and thus that F. diurna and F. nocturna, being indistinguishable in fresh and stained specimens, have a common adult form."

Periodicity.—" Cases of filarial infection occur in whom the hour at which the maximum number of embryos is present in peripheral blood is not midday and midnight, but may be any other hour—3, 6, or 9 a.m. or p.m."

As shown by Mackenzie, Manson and Thorpe, the periodicity depends on the sleeping habits of the

definitive host.

The Adult Form. — Manson has suggested that F. diurna might be the larva of F. loa. F. diurna has been found in some cases of natives in which F. loa has been removed from the eye, but cases have occurred in which no embryos could be demonstrated in the blood.

The Intermediary Host.—F. nocturna has been successfully cultivated in several species of mosquitoes belonging to the genera Culex and Anopheles. "We were able to cultivate this embryo in Anopheles costalis; but all our efforts to cultivate F. diurna failed. But this is not remarkable, for if F. diurna had been evolved in consequence of the habits of the natives, it is not unnatural to expect that its intermediary host is an insect, probably a mosquito, not essentially nocturnal in its habits, such as A. costalis, but one whose habits are diurnal."

Concurring fully with the authors as to the importance of the subject. I propose to discuss the various arguments on which they base their opinion, and, in opposition to their statement, I will endeavour to prove that F. nocturna and F. diurna represent distinct species, and that F. diurna is very probably

the larval form of F. loa.

Geographical Distribution.—The geographical distribution of F. nocturna (F. bancrofti) is very extensive. On the other hand, that of F. diurna appears to be greatly restricted. Unfortunately, our knowledge of the geographical range of F. diurna is as yet very imperfect. F. diurna was first discovered by Manson in two patients, one of which came from Old Calabar, the other from the Congo. Later, he found it in the blood of a negress from Dahomey. Recent observa-tions show that it is very common in certain districts of the Lower Niger. Drs. Annett, Dutton and Elliott propose to add the Friendly Islands of the Pacific Ocean to the stations of F. diurna, because they believe that the filaria described by Thorpe<sup>2</sup> "must be taken as F. diurna." Their assumption is most gratuitous: Surgeon V. Gunson Thorpe, R.N., during the survey of Tonga by H.M.S. Penguin, August—December, 1895, examined the blood of 214 adult Tongans and found a filaria embryo closely resembling the embryo of F. bancrofti, but somewhat smaller in size and exhibiting no periodicity. "Ninety-six natives were examined both day and night, and, with two exceptions, all those with filariæ in the blood at night exhibited them in the daytime in equal numbers and vice versâ." Surgeon Thorpe came to the conclusion that "no sufficient grounds exist for regarding

this filaria as a new species, in spite of the absence of periodicity and certain differences in measurement of its size; and that therefore we must consider it to be F. nocturna, the periodicity of which has been altered and modified by the habits of the natives of the Tonga Island." The filaria of Tonga is possibly distinct from F. bancrofti, but I fail to see why it must be taken for F. diurna.

The fact that *F. diurna* does not prevail in any place alone, while *F. bancrofti* is found in many lands alone, does not in any way prove the identity of these two hæmatozoa, but is merely a proof of the different

and wider distribution of F. bancrofti.

Drs. Annett, Dutton and Elliott, in speaking of the geographical distribution of F. bancrofti and F. diurna, make a statement which proves that they consider the term elephantiasis as synonymous with filariasis. They say: "The distribution of elephantiasis (caused by the presence of the adult form of F. nocturna in the lymphatic vessels and other sites) is extremely So far as I am aware, it has been suggested, but not proved, that F. bancrofti is the cause of elephantiasis. Elephantiasis is a frequent and striking accompaniment of filarial infection, but I think it is more a sequela than a manifestation of the helminthiasis. It is probably due to the bacteria which cause the intercurrent attacks of lymphangitis to which a filariated patient is so liable in the obstructed lymphatic regions of his body. The incidence of elephantiasis within the endemic areas of F. bancrofti varies greatly, and a similar condition may be met independently of filariasis.

Microscopical Appearances of the Embryos.—Drs. Annett, Dutton and Elliott state that they were unable to detect any difference between the embryos of F. diurna and F. nocturna. "They appeared identical in their appearance, characters, measurements and movements in fresh preparations, and correspond in length, breadth, staining reactions, and in the possession of the same number of 'spots,' situated at similar points along the length of the worm, and of the same shape and size. The sheath, a common feature of each, appeared identical."

Having seen only a few badly-stained specimens of F. diurna, I am not in a position to make any remark as to the morphological distinctions between F. diurna and F. nocturna. Dr. Manson states that although practically indistinguishable when seen alive in the blood, F. diurna shows a singular difference on dried and stained slides of thickest blood-films. looks shrunken and thickened and assumes a stiff, rigid attitude, which is perfectly characteristic. In the specimens I have been able to examine, I have certainly noticed this peculiar attitude of F. diurna, which is strikingly different to that of F. nocturna, usually arranged in smooth, graceful curves. Another feature probably characteristic of F. diurna is the recurvation of the tip of its tail, which is present in most specimens. Dr. Manson was the first to notice it, and I drew his attention to an identical recurvation in the embryo of F. loa.

Dr. Prout<sup>3</sup> found *F. diurna* twice in Sierra Leone. He says: "I am inclined to believe, from measurements of stained specimens (though I am aware this is apt to vary), that *F. diurna* is a slightly smaller worm

than nocturna, and that the tail does not taper so sharply." Prout also examined a patient who had had two specimens of F. loa removed, one from the loose skin of the penis and the other from the eyelid. He found the peripheral blood swarming with a sharptailed embryo. He says the point of the tail was not so sharp as that of F. nocturna, but he does not mention whether this embryo had a sheath or whether

it observed any kind of periodicity.

Analogy with Avian Filariasis.—Having found easily distinguishable embryos in a few bird filariæ examined by them in West Africa, Drs. Annett, Dutton and Elliott make the remarkable statement that because they are unable to distinguish F. diurna and F. nocturna in the embryonic stage, these two worms must have a common adult form! A wider study of comparative pathology would no doubt have made them more cautious. As Manson justly observes in his article on F. diurna (Davidson's "Hygiene and Diseases of Warm Climates"), " a close anatomical resemblance between two specimens of filaria embryos is no sufficient reason for concluding that they belong to the same species. It is a well-known fact that nearly all filaria embryos closely resemble each other, even although they may belong to widely different species. In many cases the species, as regards their embryos, are only distinguishable by the physiological tests of habit and ultimate developmental change.

Periodicity.—It was chiefly on account of its peculiar diurnal periodicity that Manson described F. diurna as the embryo of a distinct species. "I can readily understand," he says, "objection may and probably will be taken by some to the inadequacy of the data from which I infer the existence of a third species of blood-worm in man. My confidence, however, in the regularity of the operations of Nature, even as affecting these lowly organisms, is such, that the one fact of difference of periodicity in the sharp-tailed, sheathed filariæ is to me quite sufficient to prove difference of species. The opposite periodicities of F. diurna and F. nocturna constitute, from a physiological point of view, a radical and specific difference, seeing that they imply a difference in intermediary host."

Drs. Annett, Dutton and Elliott state that they observed cases in West Africa in whom the hour at which the maximum number of embryos was present in peripheral blood was not midday and midnight, but 3, 6, or 9 a.m. or p.m. But their cases, as they state themselves, were mostly cases of mixed infection, and the overlapping of the two broods with reversed periodicity must be taken into account. Besides, no one has ever stated that the maximum number of embryos of F. diurna and F. nocturna is found punctually at midday and midnight respectively. Manson, who has discovered this remarkable periodicity, says: "Towards sunset-about 5 or 6 o'clock-they (F. nocturna) begin to enter the general circulation. Gradually, as the night wears on, their numbers increase. About midnight they are most numerous. As morning approaches they get fewer and fewer, and by 8 or 9 a.m. they have disappeared. . . . Filaria diurna comes into the general circulation about 9 or 10 in the morning, increases in numbers till 1 or 2 p.m., then decreases in numbers, gradually disappearing for the night about 9 or 10 p.m.

Drs. Annett, Dutton and Elliott ascribe the periodicity of F. diurna to the merry habits of the West African natives, who "sing and dance the whole night through, especially on moonlight nights!" That the periodicity of F. nocturna may be for a time inverted or completely broken up by a change in the sleeping habits of the host, the experiments of Mackenzie and Manson have undoubtedly proved, but I cannot agree with the authors when they state that "such conditions would, in a great measure, account for the variety in the cases of filarial infection we met with in West Africa, and which Thorpe observed in the Friendly Islands, and point strongly to the identity of the two embryos, or rather to the phenomenon of the accommodation of the one or the other, or of an original embryo perhaps exhibiting no periodicity whatever, to the varying habits of the natives who formed their babitat.

Filarial periodicity has not been determined by the sleeping state, as some have conjectured, but is evidently correlated with the life-habits of those insects which have become the liberating agents of the blood filariæ. We can find a large number of similar remarkable adaptations in Nature. Many flowers which open early in the morning are only visited by particular butterflies which leave their nocturnal haunts at the same hour. Other flowers do not open till sunset and they are visited by Hawkmoths, silk-moths, owlet-moths and other Noctuæ, which commence their ramblings when dusk sets in. Then, again, the development of flower-scent is simultaneous with the time of flying of certain insects. The flowers of Hesperis tristis and other flowers which are visited by small nocturnal moths give off no scent during the day, but exhale a strong hyacinth odour at twilight; on the other hand, many flowers visited during the day become scentless at night. Although a change in the sleeping habits may bring about an inversion of periodicity in cases of F. nocturna, just as the application of a wet sponge on a limb harbouring the adult F. medinensis may induce this worm to eject some of its embryos inopportunely, I believe; he swarming of F. diurna in the peripheral blood during daytime is not due to the wakes of the natives of West Africa, but to the diurnal habits of the intermediary host of F. diurna.

It is to be regretted, I think, that Drs. Annett, Dutton and Elliott, who ascribe the periodicity of F. diurna to the midday naps of the Kroo boys, did not make any experiments to find out whether they could invert the periodicity of F. diurna by causing the natives to sleep regularly during the night.

In one case of F. diurna, most carefully investigated by Dr. Manson, the patient kept very regular habits and slept only at night, yet the diurnal periodicity of his filaria embryos was constantly the same.

The Adult Form.—Dr. Manson has suggested that F diurna may be the embryo of F. loa. He says: "The patient who supplied me with blood for my observations on F. diurna informed me that when a child he had a F. loa in his eye; that after a time it disappeared spontaneously; and that this is not an uncommon parasite in his country." Other cases of the simultaneous presence of F. loa and F. diurna have been mentioned by Drs. Prout, Annett, Dutton and Elliott, but the latter three gentlemen look upon

it merely as an ordinary coincidence, and oppose the idea of any possible connection by stating that cases of F. loa have occurred in which no embryos could be demonstrated in the blood. I believe Manson's suggestion deserves great consideration. Several filariæ have been mentioned as parasitic of man on the West Coast of Africa. We know of the presence of F. bancrofti, F. perstans, F. medinensis and F. volvulus. Of these filariæ we know both the early larval forms and the mature adult forms. F. bancrofti and F. perstans have a wide distribution in Africa and in other continents; F. medinensis is also very widely distributed, but it is absent in many parts of West Africa. F. volvulus is apparently limited to West Africa. Dr. Prout has recently described a very large, non-sheathed, blunttailed filaria embryo in the blood of a native of Sierra This filaria embryo, which he has called Leone. F. gigas, has evidently no connection whatever with F. loa. There remain, therefore, only a filaria embryo, F. diurna, and an adult filaria, F. loa, both very common in the natives of West Africa and both with exactly the same geographical distribution, a distribution singularly limited to West Africa. These coincidences strongly suggest a connection between F. diurna and F. loa.

But, if F. diurna be the embryon c form of F. loa, how shall we explain the fact that embryonic filariæ are not always found in patients known to harbour F. loa? I think I can explain this fact quite satisfactorily. F. loa develops very slowly within the body of its definitive host; it may not reach maturity for many years, as proved by the cases described by Mitchell, Ludwig and Saemisch. In its mature stage, and long before attaining maturity, it may frequently appear about the eyes, cruise round the eyeball in the cellular tissue between the conjunctiva and sclerotic, or pass rapidly from one eye to the other through the cellular tissue under the skin at the root of the nose. Occasionally, it may be felt wriggling under the skin of the forearm and fingers. The slow development of F. loa and the frequent excursions of this parasite during development explain the great differences in the size and development of the worms removed from the conjunctiva of various patients. It is evident, therefore, that a patient may be suffering from F. loa for years before any embryos can appear in his blood. Being usually obnoxious during its restless developmental stage, the loa is frequently removed before it has attained full maturity. The natives use for this purpose a bamboo spike. Then, again, the patient may harbour only one loa producing too small a number of embryos for diagno-is, or he may have only a male loa. Another interesting and most suggestive coincidence which has not been noticed hitherto, is that while children are very frequently the bearers of F. loa, only adults appear to be infected with F. diurna. Drs. Annett, Dutton and Elliott state that "In the examination for malarial parasites of blood specimens from a large number of native children of all ages up to about 18 years, we encountered a single filarial embryo only in one case (specimens taken during the day were examined only), aged 11, out of 390 cases. In view of the number of adults infected with F. diurna in the same districts this is remarkable, and further tends to support the idea that the extent of infection increases during the period of childhood, until, when adult age is reached, there are a sufficient number of mature female filariæ in the body to give an observable number of embryos in peripheral blood during the usual examination for micro-

scopical purposes.

Probably Filaria loa, like F. equina, after attaining full maturity lodges itself in the peritoneum or in the pleura and there attends to parturition. Prior to reaching full maturity, F. equina is frequently found in the eye of its definitive host, which may be a horse, an ass, or a mule. Professor Blanchard has recently pointed out that F. loa exhibits at its cephalic extremity two papillæ in the form of spinules. Similar structures are seen in F. equina and other filariæ of various animals. F. labiato-papillosa of cattle and deer is another filaria of the serous membranes which, before attaining full maturity, may be found in the eye of its host. The embryos of both F, equina and F. labiato-papillosa are found in the peripheral blood of their definitive hosts; it is therefore quite reasonable to infer by analogy that the embryos of F. loa should be found in the peripheral blood of man.

The female specimen of F. loa removed from the eye in Dr. Robertson's case was almost mature, and contained fully-developed embryos in the lower part of its uterine tubes. Dr. Manson who examined this specimen says: "The more mature embryos resemble in size and shape those of F. nocturna and F. diurna, but in consequence of the method of mounting it is impossible to say if they are possessed of a sheath or not. If they are possessed of a sheath, I should say that they are practically indistinguishable

from the parasites mentioned.

From the description and drawings of the embryos of F. loa in the case described by Ludwig and Saemisch, I am led to believe that the development of the embryo in F. loa is probably the same as in F. nocturna, and that in both cases the embryo stretches its egg-membrane into a "sheath."

From the above facts, I think we may conclude that the connection between F. diurna and F. loa is very probable, whilst the identity of F. diurna and F. nocturna, suggested by Drs. Annett, Dutton and

Elliott, has no foundation whatever.

### REFERENCES.

1 Of some parasitic filariæ only the larval form is known, of others only the adult form. This way of finding the worm separately in one or other stage of development has given rise to an inappropriate and confusing nomenclature. Each parasite has received two different names. This is by no means the only instance of the kind in the nomenclature of natural history. A well-known example is that of the Mexican sala-mander. It was called Axolotl when found in water, still retain-It was called Axolotl when found in water, still retaining its gills, and Amblystoma when found on land without gills and with other slight modifications. The two forms were originally referred to different genera, and, indeed, it was only in 1865 that it was discovered that Axolotles, though able to retain the larval condition permanently, might, under suitable conditions, assume the salamander stage and become Amblystomas. F. nocturna should be called F. bancrofts after the name of its parent form discovered by Bancroft.

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(To be continued.)

### REPORT OF A CASE OF BILHARZIA FROM THE WEST INDIES.

By P. Manson, C.M.G., M.D., F.R.S., LL.D.(Aberd.).

With the exception of Mesopotamia, Cyprus and Mauritius, bilharzia disease has hitherto been supposed to be peculiar to Africa. The following case shows that the parasite has a wider range. until I came across this case, I never encountered the disease in patients from the West Indies, but its occurrence in a white man from that part of the world practically proves that in certain of these islands, if not in all, it must be by no means uncommon amongst the coloured population. Now that attention has been directed to the subject, we may hear from time to time of similar cases. is evident that the distribution of this and similar parasitic diseases depends on the presence or absence of the efficient intermediaries. Possibly our zoologists may be able to point to some mollusc or arthropod which the West Indies and Africa have in common, and thereby indicate the long-sought-for, but hitherto undiscovered intermediary host of Bilharzia hamatobia. Another African disease, guinea-worm, was at one time said to be endemic in Curação and others of the West Islands, and in a limited area in Brazil. I understand the disease has disappeared from Curação, and we have no longer accounts of its presence in the Brazils. It may be that bilharzia has obtained a similar precarious footing in the Western Hemisphere, and that subsequently it will disappear from that part of the world; meanwhile we can assert its presence there as a fact.

I may mention that the patient, an Englishman and a professional man, came to me as a private case complaining of vague symptoms, lumbar pain, headache, &c. As I could not account for the symptoms, and as he looked anæmic, and knowing that he came from a place where ankylostomum duodenale is very prevalent, the idea that he suffered from ankylostomiasis occurred to me. I made an examination of his fæces and so discovered the ova of bilharzia. In this case, as so often happens in bilharzia ova from the alimentary canal, the spine is placed laterally.

I am indebted for the following notes on the case to Dr. Ross and Dr. Daniels, of the London School of Tropical Medicine.

Previous History.—The patient is an Englishman aged 38. Five years ago, in Antigua, after a heavy day's work he felt a dull pain in the lumbar region; it went off after rest, but would come on again after active exercise. During the last year this pain has increased in severity and duration; was invalided home on account of it. Has resided in the West Indies chiefly for fifteen years, and has had many attacks of malaria. Never passed blood in his urine; never noticed blood in his stools.

Present State.—Temperature 97°; tongue slightly coated; is slightly anæmic; complains of right frontal headache; has some enlargement of liver and spleen.

Microscopic Examination. - Faces, bilharzia ova not numerous; generally distributed throughout the fæcal

mass; lateral spined. Urine, no ova or blood-cells. Blood.—(By G. Duncan Whyte.) Hæmoglobin, 84 per cent.; red blood-cells, 4,650,000; white blood corpuscles, 8,200; polymorphonuclear leucocytes, 49 per cent.; lymphocytes 21 per cent.; mononuclear leucocytes, 17 per cent.; eosinophiles, 12 per cent.; intermediate, 1 per cent.

History of Patient's Residence in West Indies .- By himself. I went from England to Antigua in May, 1887. In the place I lived in there are a good number of swamps, but my house was a mile from the nearest; water was obtained from cisterns (iron) and ponds, was often stale, and contained visible living things; had two or three attacks of malarial fever, one severe.

I removed to Anguilla in 1889. It is a flat and dry island. The drinking water came from stone cisterns, the bath water from wells. My health here

was fairly good.

Moved to St. Kitts in 1891. This is a mountainous island, no swamps within six miles of my residence; water from public service reservoir conveyed in pipes. My health was fair, but had two or three "run-downs" and one or two attacks of fever. Came to England in June, 1894, and returned to St. Kitts in January, 1895. In September, 1896, I returned to Antigua—same

district, but nearer to swamps; water from stone cistern; plenty of frogs, &c., in water, which was usually boiled; health very unsatisfactory; pain in back severe, but generally yielding to rest and treat-

In June, 1898, I came to England and returned in January, 1899. In December, 1900, I returned to St. Kitts, but to a different neighbourhood; house 600 feet above the level of the sea; nearest swamp three miles; drinking-water from private mountain source; water for baths, &c., from open mountain source (very unsatisfactory at times), passing through a village and used by everybody. On two or three occasions I got an "itch" in the bath called locally "cow-itch." My health, at first good soon failed, and for the whole of this year I have had pain in the back and headache on right side and right eye; also pains in the knee-joints and always tired. Was invalided home in July.

I ought to have added that between 1891 and 1901, I have been to Nevis on short visits many times; To Montserratt two or three water there is good. times; water there also good. I spent five days in St. Thomas in 1894, and five weeks in Barbadoes in January, 1900. I have never been to Africa or any-

where else except the British Islands.

### TUMOUR OF THE NOSE.

By J. NUMA RAT.

Medical Officer, Leeward Islands, West Indies.

I send the photograph of a young negro who consulted me about seven years ago, in St. Christopher, West Indies, about the tumour on his nose represented in his likeness. The growth was uniformly

distributed over the tip and sides of the nose, and was covered by a thick, rough, yellow crust, which was firmly adherent to the subjacent tissues. The colleagues to whom I sent the patient for examination concluded, chiefly from the presence of enlarged glands, that the case was one of syphilitic chancre; but I failed to detect any other symptoms corroborative of this diagnosis. The patient did not remain sufficiently long under my care to allow me to note the progress of the case. It will be observed on comparing the photograph with the illustrative likenesses printed with Dr. Mitchell's article in the JOURNAL OF TROPICAL MEDICINE of May 1st, 1902, that there is a great resemblance between the tumour on the man's nose and that shown in the case of the girl whose picture is on the right hand side of the illustration.

St. Kitts, West Indies, Nov. 10th, 1902.

### FILARIASIS AND SLEEPING SICKNESS.

By J. NUMA RAT.

Medical Officer, Leeward Islands, West Indies.

THE correspondence which has lately appeared with reference to the relation of filariasis to sleeping sickness, has reminded me of a case in which I performed a thigh amputation in a man suffering from elephantiasis of the foot and the leg below the knee. Out of fifteen amputations of the leg for various diseases performed by me at the Roseau Infirmary, Dominica, West Indies, during fifteen months, his was the only case which ended fatally. The wound was slow in healing but was quite healthy when, about the third week after the operation, the patient began to fall asleep at most unexpected moments. would fall asleep while eating, during micturition, &c., &c. He would wake on being spoken to, smile, eat a little, and fall asleep again, and it was necessary to keep shaking him to keep him awake so that he might be fed. He continued in this state until his death, never having exhibited any other symptom of disease.

St. Kitts, West Indies, Nov. 10th, 1902.

### THE BACTERIA OF THE MOUTH AND THE ANTISEPTIC PROPERTIES OF ODOL.

By Professor Stanley Kent, M.A.

Director of the Clinical and Bacteriological Research Laboratory of the University College, Bristol.

One of the most noteworthy advances to be observed at the end of the nineteenth century is the rapid spread of education amongst all classes of the population. It is an age of education, and this is not less true of matters which concern the individual than of matters which concern the

Notably in matters of personal hygiene there has been a great change taking place amongst the common people, and to-day the necessity for a daily bath is recognised by many who would have scorned such a suggestion only a few years ago, whilst in other directions also, a knowledge

of physiology is leading to a more rational mode of life.

There is one department of personal hygiene, however, in which but little progress has yet been made. We refer to the hygiene of the mouth, and it is almost certain that the lack of advance in this particular is due to ignorance of the inconvenience which a neglect of the mouth involves. Unfortunately, scarcely anyone realises that it is to such neglect that decay of the teeth is largely due-decay which is a source of trouble to almost everyone at some period of their lives. And hence this neglect continues.

It is true that most people in the higher walks of life appear to recognise the desirability of cleaning the teeth. But what does "cleaning the teeth" really mean in their case? It means a perfunctory brush round in the morning, with or without the use of tooth-powder, whilst in the great majority of cases no further attention is given to the cleansing of the mouth in the whole of the twenty-four hours.

The result of such a state of things is easily imagined,

provided that one is acquainted with the conditions that

obtain in the mouth.

In the first place it may be said that the matutinal brushing of the teeth, though a pleasant exercise, is really not of much practical use, simply because the first meal of the day follows almost immediately afterwards, and the mastication of food, with the accompanying flow of saliva, would of itself, without any extraneous aid, cleanse the mouth very effectually from the accumulated secretions of the past night. But on the other hand, the taking of food, in most cases, results in the leaving in the various small cavities at the bases of the teeth, between the teeth, and in other tiny receptacles, remnants of food which escape the action of the tongue, and lurk for an indefinite time in the mouth. This, then, is the first term in the series-the lodging in small cavities in the mouth of remnants of food.

The second stage is the formation, by various fermentative processes, of acid substances from these food particles. Fermentation takes place in the mouth partly through the action of the salivary ferment, whereby the starchy material of the food is converted into sugar, and partly through the action of micro-organisms, whereby the sugar already formed is further changed into various acids. It is this acid which produces great injury to the teeth, and lays them open to the attacks of other micro-organisms, with the result that decay sets in, the teeth are destroyed, and all the evils of disturbed digestion follow. It is on this account that starchy food is more harmful to the teeth, if neglected, than sugar, often given in the form of sweets to children, for whilst the sugar is rapidly dissolved and washed away by the saliva, the starchy material, adhering to the teeth, is converted gradually into sugar, and then into acid, and consequently acts for a prolonged period of time, and produces a more profound effect.

In order to show how greatly the teeth may be damaged by neglect, it is only necessary to make an experiment in which the conditions existing in the (uncleansed) mouth are copied as closely as possible. If, for instance, we take a mixture of bread, meat, sugar, &c., and rub it up with saliva, and afterwards immerse freshly drawn sound teeth in the mixture, we find in the course of a very few days that a striking change has occurred. The teeth are no longer hard as they were in the fresh condition. Their hardness, upon which they depend for their usefulness in the mouth, has almost entirely disappeared, and has been exchanged for a softness so pronounced that a needle can be passed through their substance with ease. The teeth have, in fact, lost their ordinary characteristics, and are no longer at all adapted for the mastication of food.

If we allow the process to go further it is not difficult to show that soon other changes, almost exactly similar to those occurring in a decayed tooth in the mouth, take place, whereby the tissues of the teeth are gradually destroyed. If, then, this change can be produced so easily outside the mouth, it will be produced even more easily when the teeth are in situ, because the warmth of the body will favour the changes, and hasten the action. Evidently, then, one of the first things to be considered in arranging a scheme for the preservation of the teeth is the complete removal of remnants of food from the mouth, and it is abundantly evident that a perfunctory brushing of the teeth once a day, and that once in the morning, immediately on rising, is alto-

gether insufficient for the purpose.

It is, indeed, necessary that the teeth should be cleansed carefully and thoroughly after every meal, and difficult and perhaps tiresome as this will appear to those unaccustomed to the discipline, there yet can be no doubt that it is the only way, and compared with the agony of toothache, the discomfort of ill-health from indigestion, and the irritation of having a large dentist's bill to pay, there can be no doubt that it is, after all, a small price to pay for perfect teeth and a healthy mouth. More especially is it necessary to ensure a thorough cleansing of the mouth after the last meal of the day, or immediately before retiring to rest. For if this is neglected, and one retires with food particles still in contact with the teeth, during the whole of the night the fermentative changes, with consequent damage to the structure of the teeth, will be in progress.

A remarkable illustration of this is afforded by the condition often observed in the teeth of the children of the poor, amongst whom it is common habit to give to the child, when in bed at night, biscuits or other starchy food, with the object of quieting it. The result is that the child falls asleep whilst still sucking the biscuit, the teeth are left all through the night covered with remnants of starchy material, which undergoes fermentation, and produces un-

told mischief.

As pointed out by Mr. Denison Pedley, in his valuable ook, "The Hygiene of the Mouth," "the habit of giving bread or other starchy food to a child when in bed at night

should be entirely prohibited."

It is evident, then, to anyone who will give the least attention to the matter, that it is of prime importance to cleanse the teeth frequently, and especially to cleanse them thoroughly the last thing at night. But this is not all. As mentioned above, it is to bacteria that the ultimate decay of the teeth is due, the action of these parasitic plants commencing as soon as the fermentative products of the food remnants have sufficiently softened the tooth substance to allow of their invading the tissues. And we may say at once that it is altogether impossible to get rid of these countless multitudes of parasites by any amount of brushing once, twice, or a hundred times a day. They are far too small to be affected by any such treatment, they lie in crevices far too tiny to be reached by bristles, be they ever so fine, and they adhere to the surface of the tongue and cheeks in such a way as to defy the most energetic brushing. What, then, is to be done? Obviously, just as we use

a brush for the removal of the food particles, so we must use something equally efficacious for the removal of the bacteria. We must, in short, use antiseptics, i.e., substances which will act as poisons to the bacteria, and so destroy them. But it is clear that whilst acting as poisons to the bacteria, these substances must be harmless as far as the mouth is concerned, else we may be in a worse plight than And the great difficulty has always been to find a substance which, whilst being sufficiently active in killing off the bacteria of the mouth, should at the same time be harmless to the tissues of the person using it.

Long and elaborate series of experiments on this subject have been carried out by continental bacteriologists, most of the well-known antiseptics having been thoroughly Up to comparatively recent times, however, no single substance could be said to possess all the qualities desired, for whilst some were indeed powerful antiseptics, they produced injury to the lining membrane of the mouth, others possessed insufficient antiseptic power from the first, whilst others, again, whilst being satisfactory at first, soon lost their activity when stored, or sent out in the ordinary course of trade.

And finally, many of the best antiseptics possess so nauseous a taste that their daily use would be practically

out of the question.



TUMOUR OF THE NOSE.

Illustrating the Article by J. Numa Rat, Medical Officer, Leeward Islands, West Indies.

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Recently, however, there has appeared on the market a substance which, whilst possessing a powerful antiseptic action, yet is pleasant to the taste, is permanent in solution, and is altogether harmless to the lining membrane of the mouth; so that here, at last, we appear to have found an ideal substance for the cleansing of the mouth, a substance which may be used daily, which will do no harm, which is pleasant enough for children to use it readily, and which may be depended upon to do its work thoroughly.

The substance appears under the trade name of Odol, and

is to be obtained in the form of a refractive liquid of a pleasant odour and aromatic taste, which forms a milky liquid when mixed with water. The reaction of the liquid is neutral, an essential point, as an acid would bring about damage to the teeth similar to that already described as due to fermenting food particles in the mouth, whilst any trace of alkalinity would damage to a greater or less extent the

lining membrane of the mouth.

We see, then, that the preliminary requirements of a neutral, pleasant-tasting liquid are satisfied. It remains to ascertain whether the substance under consideration has that antiseptic action, and is as efficacious a poison to the bacteria as is desirable. For the purpose of ascertaining the truth on this point, a series of experiments has been made, the results of which are briefly given below.

The first set of experiments was made with the view of ascertaining the action exerted by the solution of odol in various strengths upon bacteria when grown in tubes in the ordinary manner in a pure condition. And we may say at once that we were at first somewhat disappointed with the

results.

The first organism selected for experiment was the diphtheria bacillus, as this is frequently present in the mouth, and it is desirable that when present it should be destroyed, as, although it may produce no symptoms in the person whose mouth it inhabits, it may yet be a source of infection to numberless other individuals, who may in consequence suffer from the disease in a severe form.

The experiments consisted in taking a tube containing a pure growth of the diphtheria organism, pouring into the tube a sufficient quantity of the diluted odol solution to completely cover the growth, leaving it in contact with the organism for a period of time varying from a minute to half an hour, then pouring off the solution and thoroughly washing away all traces of the antiseptic by means of successive changes of sterile water. Afterwards, some of the original growth was transferred to a new culture medium, and the tube carefully watched for signs of growth. In nearly every experiment, at the end of a couple of days, a distinct growth had taken place, thus showing that the original culture had not been killed by the treatment. It remained then to test the solution under the exact conditions existing in the mouth, since, after all, results obtained under other conditions are of comparatively small value so far as the merit of the solution as a mouth-wash is concerned.

For this purpose it was necessary to select a different organism, because it is inadvisable to place the diphtheria bacillus in the mouth, and when it is found occurring in the mouth in the case of a patient, it is necessary to get rid of it as quickly as possible without reference to experiment, The organisms selected were those usually associated with disease of the teeth, for it is these especially which are concerned, and which inhabit the mouth normally, and which, therefore, the solution will be used for destroying in

ordinary practice.

The experiments followed closely upon those of Dr. Carl Roese, who has already tested a great number of fluids of different composition. The mouth was first of all washed out with water which had been freed from all living organisms by prolonged boiling. After this preliminary washing had been accomplished, a fresh quantity of sterile water or broth was taken, and the mouth washed out with it for a definite time, usually one minute. At the end of this period the fluid was collected in a sterile dish, and carefully measured.

A minute measured quantity of the fluid was then taken and thoroughly mixed with sterile jelly, which was subsequently spread over the surface of a glass plate. The plate was then placed in an incubator kept at the temperature of the body, and examined at definite intervals for evidence of

As the jelly set, each organism present was fixed in the position it happened to occupy at the moment, so that any further development necessarily took place in that exact spot. Favoured by the warmth, each germ speedily increased and multiplied, until it produced a colony visible to the naked eye. By counting these colonies, some idea of the number of organisms originally present in the added wash water was formed, and by counting the colonies in a number of plates and taking the average, a normal standard was obtained with which to compare the numbers obtained after the action of the fluid to be examined.

After the above experiment had been carried out, the mouth was washed with the solution to be tested, in the present case with odol of various strengths, which was allowed to remain in contact with the mouth lining for periods which varied, but which were usually one minute.

Then the mouth was washed out thoroughly with sterile

water, and afterwards again washed with sterile water or broth as above, the washings collected and measured, and plates of jelly prepared as in the former test. plates were placed in the incubator at the temperature of the body, and examined from day to day in order to ascertain whether any development of the contained organisms had taken place. The experiments were repeated again and again, so as to obtain an average from which a just estimate the results might be formed.

The general results are expressed in the table attached, in which the values are calculated as percentages.

Taking the first experiment, at the end of three days, there were in the plate prepared from the wash water taken before treatment, 400 colonies, each of which must have sprung from at least one original organism in the mouth. The amount of water used for making the plate was one drop, whilst the total quantity used for washing the mouth was 105 drops. Multiplying the 400 colonies contained in one drop by the 105 drops used, we obtain 42,000 as the number of organisms capable of growth in the wash water taken before treatment.

Having thus obtained a number representing approximately the normal average of organisms present in the mouth, a second set of experiments was made as follows: The mouth was washed out for one minute with odol solutions of various strengths. It was subsequently washed out with sterile water, and afterwards sterile water or broth was used to wash it out once more. From the last washing, plates of jelly were made as in the former experiments, and these plates were placed in the incubator at the temperature of the human body. They were carefully examined from day to day for evidences of growth. The results obtained varied with the strength of odol employed. With the stronger solutions, very few colonies made their appearance, thus showing that the action of the antiseptic had been so complete as to leave scarcely any germs capable of growth in the wash water used for preparing the plate.

Comparing this with the result obtained before odol had been used, we see that in the one instance 42,000 organisms were taken up by the wash water from the mouth, whilst in the other scarcely a living organism was left. Such a result must be regarded as being exceedingly satisfactory, for it proves that odol, which we have before seen to possess pleasant taste and smell, and to exercise no harmful action upon the teeth or mouth lining, yet when brought into contact with the mucous membrane is capable of exerting such a powerful antiseptic action that practically every organism brought into contact with it is destroyed.

It remains to explain the apparent anomaly of the solution failing to kill the diphtheria organisms when growing as a pure culture in a tube, and yet being able to clear the mouth

of organisms when used as a wash.

The explanation of this is to be found in the fact (already pointed out by Roese and Frey, and more particularly in an exhaustive study of the subject by Hefelmann), that the antiseptic of odol is of itself indifferent, and must first be broken up into its antiseptically effective elements before it can develop its antiseptic power. This breaking up is effected in the test-tubes by lyes, but in the mouth by the action of the saliva, and by the septic germs themselves, but most of all by the action of the mucous membrane. This last action is of particular importance because, in consequence of the absorption of the odol mixture by the mucous membrane, large quantities of the antiseptic are mechanically deposited on the mucous membrane, and cover it with a layer. The products of the breaking up of the substance are phenol and salicylic acid, whose antiseptic properties are well known. Injurious effects are, however, completely precluded, inasmuch as these two substances are produced only in such quantities as result from the breaking up by the saliva, &c., whilst the rest, as the investigations of the above-named authors show, is changed into harmless compounds, probably with the albuminous subtances which are present.

That this result is actually achieved in practice has already been shown.

As the result of these experiments we arrive at the conclusion that in the antiseptic mouth-wash known as odol we have a medium which is neutral, without action either on the teeth on the one hand, or on the mucous membrane of the mouth on the other, which has an agreeable taste and smell, and which yet possesses antiseptic powers amply sufficient, when properly used, to render innocuous any organisms found in the mouth, and so to protect the teeth from decay and the gums from disease.

From a daily use of this solution nothing but good can result, and there could perhaps be no better means of ensuring sound teeth, and consequently, comparative freedom from digestive troubles to an advanced age, than to insist on a daily, and especially a nightly, use of odol as a mouth-wash, combined with an efficient use of the toothbrush for the clearing away of the grosser particles adhering to the teeth.

TABLE SHOWING EFFECT OF ODOL IN VARIOUS STRENGTHS IN DESTROYING OR INHIBITING ORGANISMS IN THE MOUTH.

01-1		itage of	Louis	PERCENTAGE IN EXPERIME (Ave	Percentage of Organisms Killed or		
Odol Solution employed				Untreated Mouth	Treated Mouth	Inhibited by Treatment Per cent.	
Per cent.		Per cent.	Per cent.				
25				100	0	100	
20				100	5	. 95	
15				100	20	80	
10				100	55	45	
7				100	60	40	
5				100	66	33	
2				100	76	24	
1				100	82	18	

In the above table, fractions smaller than 1 have been neglected.

ANKYLOSTOMIASIS IN ENGLISH MINES.—At the Dolwath Mine, Camborne, Cornwall, it is found that a large portion of the men are suffering from ankylostomiasis. The Home Office, some six weeks ago, instituted an enquiry into the ventilation of Cornish mines and the prevalence of miners' phthisis, and it appears that Dr. J. S. Haldane, F.R.S., during the course of the enquiry, discovered the presence of ankylostomiasis amongst the more anæmic miners.

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### THE

# Journal of Tropical Medicine

DECEMBER 15, 1902.

### RECORDS OF THE EGYPTIAN GOVERN-MENT SCHOOL OF MEDICINE.

In view of the approaching Medical Congress in Cairo, it behoves us to draw attention to the excellent work being carried on by the eminent men attached to the Kasr-el-Ainy Hospital and School in Cairo. The staff of the Egyptian Government School of Medicine, under the presidency of H. E. Ibrahim Pasha Hassan, and the directorship of H. P. Keatinge, M.B., includes such well-known names as those of Dr. G. Elliot Smith (Professor of Anatomy); W. A. Schmidt (Chemistry); Dr. Nolan, LL.B. (Forensic Medicine); H. Bitter (Hygiene); Dr. F. M. Sandwith, F.R.C.P. (Medicine); Dr. P. C. S. Tribe (Clinical Medicine); Dr. E. C. Fischer (Ophthalmology); Dr. W. St. C. Symmers (Pathology); O. Dinkler (Pharmacology); Dr. W. H. Wilson, M.A. (Physiology); Mr. F. C. Madden, F.R.C.S. (Surgery); Mr. Frank Milton (Clinical Surgery); Dr. A. Looss (Helminthology).

The records of the School recently to hand consist of a large volume, beautifully illustrated and replete with interest.

Professor Sandwith contributes an article on "The History of Kasr-el-Ainy from the year A.D. 1466 to 1901," but in his introduction to the subject traces "the earliest known triumphs of the healing art" in Egypt to a period several thousands of years before the Christian era. The first mentioned physician in history is Sekhetenanc, chief physician to a king of the fifth dynasty who lived about B.C. 3400, and "during most of the Egyptian dynasties physicians taught with the priests in the temple schools." The oldest medical book now existing is the Ebers papyrus, which "was written about B.C. 1550, though much of its contents are of far greater antiquity." The stumbling block to dissection seems to have been the belief that the soul was wounded if the body was dissected, yet specialists for the eyes, head, teeth and internal organs are mentioned by Herodotus in the fifth century B.C.

Human dissection, Professor Sandwith relates, was allowed for the first time for a few years in the Alexandrian School under Ptolemy I., who founded the Museum and Serapeum with their large libraries about B.C. 300.

From 750-1250 A.D., Arabic writers represented the highest form of medicine, and a literary Arabic language was formed and spread over nearly half the then known world.

The first hospital in Egypt was built in A.D. 875; and lunatic asylums existed in Egypt long before they were known in Europe, of which the Muristan, built in 1279, served as the lunatic asylum of Cairo until about 1856. The Kasr-el-Ainy, originally a palace (Kasr), built by Ibn-el-Ainy, played an important part in military history, and during the invasion of Egypt by Napoleon was converted into a military hospital. Subsequently it was utilised as a barracks and a school, and it was not until 1837 that Clot Bey succeeded in establishing a hospital and medical school at Kasr-el-Ainy.

The present school is highly creditable to the Egyptian Government and to the staff who carry on the work.

There is now almost every facility provided for the staff and others to try and elucidate some of the unsolved problems of tropical pathology, such as malaria, dengue, dysentery, liverabscess, leprosy, tetanus, Oriental sores, pinta, mycetoma, bilharziosis, ankylostomiasis, pellagra, and other diseases which can be studied in the wards. In order to encourage scientific research at the Medical School, the Egyptian Government gives an annual grant of £500 for original work in subjects which possess special importance for Egypt.

We hope to notify the medical and surgical work of the hospital in our next issue. They include an exhaustive article on "The Sclerostomidæ of Horses and Donkeys in Egypt," with thirteen plates by Professor A. Looss. Dr. Wilson contributes an article "On the Poison of Spiders," with especial reference to that of the Chætopelma olivacea. Mr. Madden and Mr. Milton give details of several interesting surgical cases, and the former with Dr. Goodman describe "Four Cases of Pinta." Mr. Madden also mentions "Two Cases of the Pink Variety of Myce-Besides these, the table of contents contains "A Case of Fœtal Rickets" (Drs. Sandwith and Symmers); "Four Cases of Vaginal Atresia," and "Syphilis in Egypt" (Mr. Madden); "Report on post mortems at Kasrel-Ainy" (Dr. Symmers); "Dietary of the Hospital" (Drs. Sandwith and Wilson); and a valuable compendium of "Statistics of Kasrel-Ainy," for 1900.

From the above brief enumeration it may be gathered that the visit of the members of the Congress to Cairo will certainly prove both interesting and instructive.

SPECIAL PLAGUE PRECAUTIONS IN INDIA. — The following medical staffs have been appointed to the railway plague inspection stations recently established as a precautionary measure against the inroad of plague on Delhi: Captain J. Hickie, I.M.S., and Miss Schmidt, Umballa Cantonment; Military Assistant-Surgeon W. C. Dicks and Mrs. Dicks, Sonepat; Mr. G. H. Key and Mrs. Convill, Rohtak; Military Assistant-Surgeon W. Charters and Mrs. Dissent, Rewari.

DINNER TO DR. ANDREW BALFOUR, DIRECTOR OF THE CHEMICAL AND BACTERIOLOGICAL RESEARCH LABORA-TORIES OF THE GORDON MEMORIAL COLLEGE, KHARTOUM.

AT Prince's Restaurant, Piccadilly, London, on Monday, December 8th, at the invitation of Henry S. Wellcome, a large party assembled to bid farewell to Dr. Balfour before he leaves for the Soudan, and to wish success to the newly established laboratories.

The guests were received and the dinner was served in the Rooms of the Institute of Painters in Water Colours, which were tastefully and elaborately decorated for the occasion with Egyptian trophies and curios, collected by Mr. Wellcome whilst he

sojourned in Upper Egypt.

The guests who responded to Mr. Wellcome's invitation to be present were: Dr. Phineas Abraham, Professor H. E. Armstrong, Professor John Attfield, Dr. Andrew Balfour, Dr. T. J. Barnardo, M. B. Blake, Dr. T. G. Brodie, Dr. Horace T. Brown, J. H. Balfour Browne, Dr. Wallis Budge, Mr. James Cantlie, George Christall, Dr. L. Cobbett, Dr. L. Eliot Creasy, Dr. W. H. Crosse, Dr. C. W. Daniels, Dr. D. S. Davies, Dr. W. Dowson, G. Claridge Druce, Sir Dyce Duckworth, Percy Elford, C. E. Fagan, W. J. Fisher, Dr. A. Chune Fletcher, Dr. Alex. G. R. Foulerton, W. E. Grey, Dr. Alfred S. Gubb, C. Guest, Professor R. Tanner Hewlett, Aubrey T. Hill, Dr. F. G. Hopkins, Prof. G. B. Howes, Sir William Huggins, John Humphrey, H. Finnis Johnson, Dr. H. A. D. Jowett, Prof. R. F. C. Leith, J. M. Le Sage, Edward F. Linstead, Dr. Harvey Littlejohn, Peter MacEwan, Dr. Patrick Manson, John Mellanby, John Moore, Dr. Malcolm Morris, Dr. William Murrell, Hon. George Peel, W. G. Piper, M. Post, Sir R. Douglas Powell, Dr. Fred. B. Power, Dr. Joseph Priestley, John Morgan Richards, E. Robbins, Dr. Davies Roberts, A. C. Robinson, A. Gordon Salamon, A. Scott, William Senior, Prof. R. Bowdler Sharpe, Dr. W. Vernon Shaw, Hugh C. Smith, J. Collett Smith, Sir Henry M. Stanley, Prof. E. H. Starling, R. Clay Sudlow, Surg.-Gen. Sir Wm. Taylor, Prof. G. D. Thane, Dr. John C. Thresh, M. Times, Thomas Tyrer, Dr. Thomas Wakley, junr., Maurice Waller, Dr. F. C. Wallis, W. Philip Want, W. Watson-Hill, C. Corning Weld.

Each guest was provided with a handsome booklet containing, not only the menu of the dinner, but also "Some Reminders of the Ancient Seats of Learning on the Nile," copiously illustrated.

After the toast of "The King" by the CHAIRMAN,

After the toast of "The King" by the CHAIRMAN, Mr. Balfour Brown, K.C., proposed the toast of "The Rescuers and Administrators of the Soudan" (Lord Kitchener, Lord Cromer, and Sir F. R. Wingate, and others). He said that we had won the Soudan by the sword, but we were now ruling that country and administering it with the scales of justice. The Egyptians may have been struck by our prowess, but they, in common with all races who came under British rule, were more impressed with the honesty and evenly-balanced justice with which they were being ruled.

Sir HENRY STANLEY, G.C.B., LL.D., proposed "Success to the Gordon Memorial College, Khartoum." He remarked that it was but a few years ago since the term "darkest" was wholly appropriate to many regions of Africa, but to-day the advance in civilisation was so pronounced and rapid that light was being admitted to even the most obscure parts. Even in the dark forest, which it had taken him 160 days to struggle through, a new railway to the lakes was actually in course of construction. There was a great future in store for the children of the Soudan, who were the heirs of the ages. They were the descendants of the people who had conquered Egypt and built the pyramids. In fulness of time Africa had come to its destiny. In these remote parts churches were being built, steamers were now plying the river which a few years ago was unknown, railways were multiplying, and given wise rulers, a continuity of policy and steadiness of Government. the people of Africa might attain a high state of usefulness and development. He could imagine no project better calculated to hasten that desirable end than the establishment of a centre of education such as the Gordon Memorial College at Khartoum promised to become. He wished the College all SUCCESS

HUGH COLIN SMITH, Trustee of the Gordon Memorial College Fund, in responding to the toast, sketched the foundation of the College from the time Lord Kitchener returned to England after Omdurman. This year, he said, they had not received a report from the head of the College, but last year's report was most interesting. It stated that there were five elementary schools situated in the neighbourhood of the College, where 150 boys were receiving education in order to avail themselves of the advantages of the College when it was opened. The foundation of the College was not merely the centre of the pacification of the country, but also the seat of learning, and nothing could tend so much to the improvement of that country and to the welfare of the population there, than the bringing of the people and the country into touch

with the commerce of England.

HENRY S. Wellcome (the Chairman), in proposing the health of Dr. Andrew Balfour, referred to his own visit to the Soudan, and said that when he was at the College he was struck by the fact that no provision had been made for laboratories, and he recognised the need of research and investigation in that part of the world. He was also struck by the intellect of many of the natives, and he believed that many of them could be trained in the College. He thought it was a splendid chance for some one who would make it a life-work to conduct research out there. They had had many candidates for the directorship, and among them many distinguished men. But there was no one so specially qualified for the work as Dr. Balfour, who had before him the great task of solving problems of research, and thereby conferring a great benefit upon mankind in general.

Dr. Balfour, in reply, said it was a splendid device of Mr. Wellcome to give him such a kindly send-off, and to enable him to meet those who were interested in the undertaking, which was due to Mr. Wellcome's farsightedness, scientific enthusiasm, and generosity. He had always been interested in tropical medicine. He deemed it a great honour to be appointed to the post of director, and he felt that he was about to

undertake a great work.

Mr. James Cantlie, in proposing the toast of "Tropical Medicine," referred to the excellent work that had been done in London and Liverpool by the Schools of Tropical Medicine; and amongst the many students which had passed through the London School they were proud to include Dr. Andrew Balfour amongst the number. He hoped many more would follow the excellent example set by Mr. Wellcome; for we had to look to private citizens to help us to carry out the teaching of Tropical Medicine in this country.

Dr. Patrick Manson, C.M.G., F.R.S., in responding to the toast, remarked that they should not be too impatient for the publication of results of Dr. Balfour's work. Real useful work required time and thought, and it could not be hurried. Africa was undergoing an enormous pathological revolution, and the opening up of the country meant, unfortunately, the spread of disease, owing to increased communication. Mr. Chamberlain had grasped the importance of fighting the diseases which overwhelmed many of our richest colonies, and by establishing the London School of Tropical Medicine he had struck at the very root of the means by which the enemy was to be fought. The commission sent out by the Foreign Office and the London School of Tropical Medicine to enquire into the spread of sleeping sickness around the Victoria Nyanza and the upper waters of the Nile had justified their appointment by good work, and he thought it might be interesting to know that they had already discovered the germ and cause of that fell disease.

Sir Dyce Duckworth proposed "Chemical Research," and alluded to the opportunities for extending our knowledge which were opened up by the establishment of chemical laboratories at Khartoum.

Professor H. E. Armstrong, F.R.S., in replying to the toast, stated that in this country there has not been in the past nor was there at present any lack of eminent scientists in chemistry, but that in the application of chemistry to commerce we were undoubtedly behind. Were more of our commercial men endowed with the same spirit as Mr. Wellcome, we would hear less of foreign competition.

Sir R. Douglas Powell, Bart., proposed the toast of "Bacteriological Research," which was acknowledged by Mr. A. G. R. Foulerton, Director of Cancer Research Laboratories, Middlesex Hospital.

Mr. A. Gordon Salamon, Vice-President, Institute of Chemistry, gave the toast of "Science applied to Industries." He aptly illustrated how science became the handmaid of industry, and how the national prosperity might be increased by a close union of the two.

Mr. T. Tyrer responded to the toast.

Dr. H. HARVEY LITTLEJOHN, Lecturer on Toxicology, University of Edinburgh, in appropriate terms proposed the "Health of the Chairman," to which Mr. Wellcome briefly responded.

PRESENTATION AND COMPLIMENTARY DINNER TO DR. DANIELS, SUPERINTENDENT LONDON SCHOOL OF TROPICAL MEDICINE.

On November 24th Dr. Daniels was entertained at dinner by the pupils at the London School of Tropical Medicine. Captain Entrican, of the Indian Medical Service, occupied the chair, and there was a full gathering of the students who attended the course. After the usual loyal toasts the Chairman gave "The Guest of the evening, Dr. C. W. Daniels." The Chairman dwelt upon the valuable contributions Dr. Daniels had given to the pathology of tropical diseases, and especially upon his work at the London School of Tropical Medicine. Dr. Daniels had proved himself an eminent teacher; and by his considerate patience and consummate tact, had won the respect and good wishes of not only the members of the present class, but of all the students who have had the privilege and the advantage of coming under his tuition. The contemplated transference of Dr. Daniels to the laboratory at Kuala Lumpor, in the Federated Malay States, for a period of two or three years would be a loss to the school but a gain to science, and it is, he hoped, as he understood it was intended, that Dr. Daniels would return at the termination of his services abroad to once more take up the work of Superintendent of the School. Dr. Taylor Hancock proposed the toast of "The Imperial Forces" in a patriotic speech, which was responded to by Civil Surgeons E. Langley-Hunt, C.M.G., and Lunn. Dr. Sandeman gave the "Colonial Medical Service," which Doctors Cameron Blair and de Boissière acknowledged. Dr. Davies proposed the health of the Vice-Chairman, Dr. Hood, and Dr. Daniels gave the toast of the Chairman.

In the name of the students the Chairman, in an appropriate speech, presented Dr. Daniels with a handsome silver bowl and a micro-photographic

apparatus.

As significant of the importance and world-wide influence and reputation of the School, one speaker remarked that the company present was of a cosmopolitan character, no quarter of the globe being unrepresented, but that the different component elements were bound together by a common language, a common flag, and by the educational benefits they had received at the London School of Tropical Medicine.

# Current Fiterature.

### SLEEPING SICKNESS IN EAST AFRICA.

C. A. Wiggins, Medical Officer, East Africa Protectorate, contributes to the Lancet notes on sleeping sickness amongst the Wa-Semi, a people belonging to the Wa-Kavirondo residing on the north shore of Kavirondo Bay, Victoria Nyanza Lake. His observations we summarise as follows:—

Advent of the Disease.—Fourteen months previously. Extent of Infection.—Half the population.

Etiology.—No Filaria perstans parasites were found in the blood of residents in the districts, but

they were found in nearly every Msoga resident on passing through the district, whether he was healthy or otherwise.

Signs and Symptoms.—The expression varies with the stage of the disease. At the end of the first month the expression implies "vacancy"; at the end of the second month the manner becomes listless and vacant; at the end of the third month the saliva dribbles from the mouth, the body is filthy, and the sufferer has to support himself by a stick; at the end of the fourth month the patient lies in his hut without changing his position. Bed-sores are, according to Mr. Wiggins, the chief cause of death. Crawcraw is a common skin complication. An inordinate quickening of the pulse is a constant and special feature of the disease, the average rate during the first month being 116; during the second month, 131; during the third month, 135; and during the fourth month and onwards, 151.

Enlargement of Glands.—The glands, especially the cervical and groin glands, were enlarged in every case of the disease met with; and in children, in six cases, the cervical glands were acutely inflamed.

Sex.—Of 150 cases reported upon, twenty-five only were women, but probably shyness kept the women

Duration of Illness.—Two cases only of over five months' duration were seen.

Treatment.-Arsenic was administered, and as much as 20 minims of Fowler's solution were given three times daily to children, with some possible benefit.—Lancet, December 13th, 1902.

### PLAGUE.

### PREVALENCE OF THE DISEASE.

India.—During the weeks ending October 18th and 25th and November 1st and 8th, the deaths from plague in India numbered 10,730, 10,491, 8,915 and 10,488 respectively. Special precautions are being taken in India to ward off plague from Delhi during the approaching Durbar.

EGYPT.—During the weeks ending November 16th, 23rd and 30th, the cases of plague in Egypt were returned as 1, 1 and 0 respectively. The last case of plague occurred in Egypt on November 19th.

CAPE OF GOOD HOPE.—The last case of plague in Cape Colony died on September 23rd; since then there have been no cases of plague in the Colony. Plague-infected rats have been found in Port Elizabeth as late as November 7th.

Mauritius. - During the weeks ending November 13th, 20th and 27th, the fresh cases of plague amounted to 23, 30 and 17, and the deaths from the disease to 14, 21 and 12 respectively.

PROPHYLACTIC INOCULATION AGAINST PLAGUE TEM-PORARILY SUSPENDED IN THE PUNJAB.—A Reuter's telegram dated Bombay, December 2nd, is responsible for the statements that extensive inoculation against plague has been temporarily suspended in the Punjab owing to the supply of prophylactic serum having given out. The same telegram also states that ten persons died from the effects of the serum used for inoculation having become contaminated; and further,

that the contamination was due to the changes suggested by the Plague Commission in the method of preparation. We defer comment upon the last part of the communication.

### EXCHANGES.

Annali di Medicina Navale.

Archiv für Schiffs u. Tropen Hygiene.

Archives de Medicine Navale.

Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie.

Australasian Medical Gazette. Boletin de Medicina Naval.

Boston Medical and Surgical Journal.

Bristol Medico-Chirurgical Journal. British and Colonial Druggist.

British Journal of Dermatology.

British Medical Journal.

Brooklyn Medical Journal.

Caducée.

Climate.

Clinical Journal.

Clinical Review.

Giornale Medico del R. Esercito

Hong Kong Telegraph.

Il Policlinico.

Indian Engineering. Indian Medical Gazette.

Indian Medical Record.

Janus.

Journal of Balneology and Climatology.

Journal of Laryngology and Otology.

Journal of the American Medical Association.

La Grèce Médicale.

Lancet.

Liverpool Medico-Chirurgical Journal.

Medical Brief.

Medical Missionary Journal.

Medical Record.

Medical Review.

Merck's Archives.

New York Medical Journal.

New York Post-Graduate.

Pacific Medical Journal.

Polyclinic.

Public Health.

Revista de Medicina Tropical.

Revista Medica de S. Paulo. Sei-i-Kwai Medical Journal.

The Hospital.

The Northumberland and Durham Medical Journal.

Treatment.

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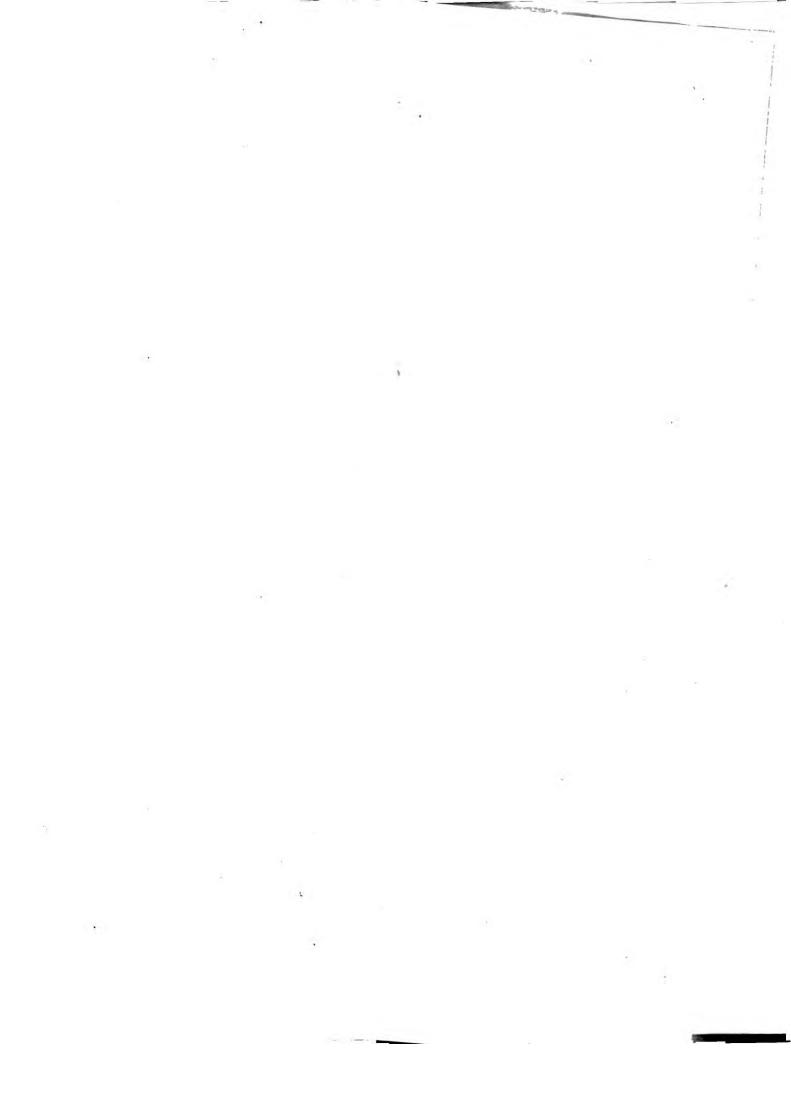
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